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# DIESEL and GAS ENGINE PROGRESS

N INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

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FRONT COVER ILLUSTRATION: Maintaining township roads in Rockford, Illinois, is an Allis-Chalmers motor grader, equipped with a General Motors Diesel engine, pulling the shoulder on one of the town's suburban roads.

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# TEN YEARS OF DIESEL PROGRESS ON AMERICA'S RAILROADS

July 1 Shows But 24 Steam Locomotives On Order As Against 765 Diesel!

By CHARLES F. A. MANN, Associate Editor

**T**HE U. S. Railroad industry has come far since the first Burlington Zephyr streaked up the Mississippi and out toward Denver—the world's first Diesel passenger train built from a brand new concept for a brand new era.

The early rivalry between the Union Pacific and Burlington for Streamliner-Zephyr and Diesel "firsts" made exciting history and went far to lift America from the depression.

But we must doff our hats to Ingersoll-Rand and the New York Central, Central Railroad of New Jersey and perhaps one or two other unknowns who long before that dabbled in Diesel switchers to solve the smoke problem in the New York area's crowded terminals. These people tried Diesel on the railroads and partially gave it up as a pleasant specialized railroad toy long before the ponderous wheels of General Motors—Electro-motive—Winton engine's great "Brain Trusts," through H. L. Hamilton envisioned an America entirely Diesel with steam peacefully reposing under a granite monument near the mouth of the coal mine.

In the January 1946 issue of DIESEL PROGRESS, this writer declared that steam was a "dying duck"—right smack in the middle of the "Premiere" of some of the finest, biggest and fastest, not to mention most overweight, complicated and freakish fleet of "big steam" power ever turned loose on the railroad industry.

Twenty months have passed and our challenge stands out in even bolder relief as America recovers from the primary postwar "depression" scare—a floppo of business that has failed to arrive. Today the U. S. railroads have practically eliminated steam from their forward thinking in spite of the vast complexities of our financial interests between big steel, big coal, big railroads, big insurance and big banking enterprises that can forestall technological progress by merely refusing to change "policy" and seek status quo by neatly scratching each others backs, under the tables of Boardrooms, while defying economic laws.

Now that it can be told, at least eleven, almost a dozen, publications have been used to pre-

serve the illusion in the U.S.A. that steam locomotives would never die. Since the Fall of 1946 four of them have begun subtly to change their editorial policies, and three of them bid fair to fold up and join the historical relic shelves of America's steam railroad past.

DIESEL PROGRESS alone of all U. S. journals has stuck by its convictions acquired in 1934, that the ultimate fuel for transportation would be liquid, not solid; the simplest and most chemically accurate procedure is to burn it in the cylinder of an internal combustion engine in as near black petroleum state as the injection system and metals used in the engine would stand and thirdly, until the scientists find some method of releasing the power in petroleum fuels other than in the simple engine devised by Dr. Diesel, America is betting its investment dollars safely on mass-production of Diesel engines and peddling them in every size and shape in every field where prime mover power is required.

At times when the four-color spreads came out on steam and mercury turbines; gasoline motors that could burn high octane with sparkplugs or injection pumps; jet motors that could push a piece of aluminum wing weighing 2,000 lbs. faster than the speed of sound; gas turbines that could burn powdered rolled oats or lignite—it has been difficult, perhaps, to keep Diesel in proper focus.

And when a solvent railroad worth perhaps a billion bucks, decides to waste \$3,000,000 on three steam monsters weighing 67,000 lbs. per axle, suitable for a small stretch of 160 lb. rail which 97% of U. S. railroads cannot afford to possess—covering it up with a publicity cocoon of "Hogs can cross a Continent" or "Tickets on Credit," 90% of the U. S. public turns away from Diesel and wastes 24 months wondering if Goliath Diesel has met its David in the form of coal fired steam turbine-electric. Never realizing, of course, that the 4-stage thermal losses from \$6.00 per ton coal, may make the gross-ton-mile costs so high that the experiment may have to be charged off to Publicity instead of being worn out hauling freight or passengers in the usual 15 or 20 year depreciation manner.

But Diesel on U. S. railroads has, so far, been 150% publicity proof—from the adverse side, that is. The U. S. systems owning a finger-control in the nation's biggest coal piles—one of which wasted \$54,000,000 of cool stockholders cash on a fleet of engines so big that it takes 1500 lbs. of their own company coal to cover the grates in the apartment-size fireboxes—have been the magnificent lasts to come around to Diesel. Oddly, with but three exceptions, these last giants who held out against Diesel so long, have seen their common stocks shrivel more than half on the New York Big Board, since the Summer of 1946 . . . while weaker competitors whom they laughed at—who bought Diesel early in the game, have seen their common stock more than double in the same period.

And we must acknowledge the right-about-face of the Southern Pacific, Union Pacific, Pennsylvania and New York Central on Diesel, has been a magnificent spectacle and possibly they deserve the role "honorary pallbearers at the funeral of steam" on the U. S. railroads.

In 1937 the U. S. lines owned 44,015 steam locomotives of all classes, totalling 2,166,483,438 lbs. tractive effort. By July 1, 1947 this fleet of steamers had shrunk to 35,976 locomotives, but with a shrinkage of less than 200,000,000 lbs. in tractive effort, proving that the average size of the average steam engine had increased about 20% while the total number of engines had shrunk about 23%.

By sharp contrast the January 1, 1937 Diesel picture is amazing for its utter insignificance! There were by that time—three years after the start of the Streamliner-Zephyr era—but 176 Diesel locomotives in the entire country, with a total tractive effort of 9,042,384 lbs. Of this total, but 21 were passenger; 4 were freight; none were combination or all-purpose and 151 were switchers. As late as January 1941, but 11 freight Diesels were in service.

Passenger Diesels owned by U. S. railroads climbed gradually to a maximum of 179 in 1942 and evidently had their gears changed to freight, remaining at the 150-plus level until

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1945, after which they went up in 100-locomotive jumps until July 1, 1947.

There are now 410 Diesel passenger locomotives in service in the U. S. A., a jump of almost exactly 100% in total in only 18 months since January 1, 1946.

During the war years Diesel passenger locomotive building stood still for nearly 48 months, while freight Diesels increased rapidly in 1944 and 1945, from a 1944 ownership of an even 100 to a January 1, 1947 ownership of 465, and exactly 104 Diesel freight locomotives have been added since January 1, of this year! The July 1, 1947 total freight Diesel inventory is 569, ten times greater than in 1943!

The advent of Diesel really got underway in a large way in 1942. As of January 1, 1942, 1,275 Diesel locomotives with a combined tractive effort of 69,342,567 lbs. were in service on U. S. railroads, 1,046 of which were Diesel switchers accounting for 55,675,220 lbs. tractive effort—or all but about 13½ million lbs. of the total capacity.

So Diesel railroad progress begins to take stride just 5½ years ago—think of it—for in that short span of time America's Diesel locomotive inventory has risen to 3,837 locomotives with a combined tractive effort of 288,143,914 lbs., as of July 1, 1947! Diesels now account for about 15% of America's total locomotive tractive effort, and on an availability basis gleaned from actual daily operating practice, this percentage magnifies itself to about 42% of steam locomotives combined daily tractive effort availability.

There is a new category of motive power on U. S. railroads emerging . . . the combined freight and passenger Diesel locomotive, brand new since 1942 with Diesel but new with steam since 1938.

On top of the ownership figures for freight and passenger Diesels, lies another 113 locomotives in the all-purpose category—52 of which were in service in 1945 and but 6 on January 1, 1942.

The most startling contrasts of all, however, are to be found in the switcher class of U. S. motive power.

On January 1, 1937, apparently the Twilight of steam switchers began, for on that date, 56 steam switchers and but one Diesel switcher was on order. The nation had 8,175 steam switchers in its inventory and but 151 Diesels. Never again, from that date, with exception

of the year 1944, when 41 steam switchers were on the January 1945 order books, has the steam switcher taken the spotlight. With but 7 steam switchers on order January 1, 1938, none a year later and but 14 in the entire three-year period following, the trusty old Yard Goat that smelled up and dirtied up and noised up America's terminals has been dying rapidly on the Railroad Vine. As of July 1, 2000 of these have died and gone to the scrap pile. There are 6,124 left, a shrinkage of just over 25%.

Diesel, in the period between January 1, 1942 and July 1, 1947, however, having risen from 1,046 to 2,745 units, with an availability projection of three times that of steam—let's say two times to be conservative, gives the U. S. A. the equivalent of about 5,000 Diesel switchers or but a thousand less than the steam switcher inventory, on a daily and hourly availability basis.

Diesel switcher orders have totalled 768 since January 1, 1945 as against but five steamers. The end of the steam yard goat is positively at hand . . . and due credit goes to the Santa Fe for boldly announcing four years ago that it would never again order a steam switcher . . . the first U. S. railroad to so declare its policy which has since been copied by every other railroad.

In the electric motive power field, straight across the land from one coast to the other, those systems with major electrifications have kept level . . . but largely with old equipment kept running by heavy repairs and buying up scrap electric power from folding lines who either have gone out of business or gone Diesel.

Practically every shortline electric railroad has abandoned its electric passenger service and Dieselized its remaining freight service—even out West where electricity is supposed to be cheap . . . 3 mills per kilowatt, however, isn't cheap when it adds up to 14 mills at the rail of an old D.C. electric!

Vast interurban systems like the S. P. operated at San Francisco—in fact all the electric network around San Francisco Bay, has shrunk to a few Diesel freight runs and buses running over pavement where rails were before. Only the electric commuter and terminal lines of the East, and the Pennsylvania and Milwaukee electrifications still stand . . . along with the Virginian and a few big mine electric operations in the Rocky Mountain area.

Many of these may, by 1948, abandon to Diesel—not even the threat of higher fuel prices ex-

ceeds the abhorrence of red-ink electric operations in low-traffic zones.

As of January 1, 1937, 297 steam locomotives and but 7 Diesels were on the books. Five years later, the ratio of steam and Diesel orders stood almost equal, perhaps for the last time in history. 258 steamers were on order, mostly giant freights, and 265 Diesels, mostly switchers. Ironically, the onrush of Diesel panicked the steam crowd of the Atlantic seaboard—particularly Wall Street Board Rooms, and in the next two years, orders for steam—those streamlined beauties in four colors, with superheaters, syphons, foam colliders, lightweight drive rods, boxpok wheels and welded boilers with 25 miles of tubes—increased to 355 in 1943 and 339 in 1944—thence to hit the skids and drop sharply to a mere 66 on January 1, 1945, up to 92 a year later and down to a mere 24 on order as of July 1, 1947.

The twilight of big steam—they were mostly all freight, but 51 steam passenger locomotives have been on order since January 1, 1943—began in 1944.

So America's steam locomotive dies away.

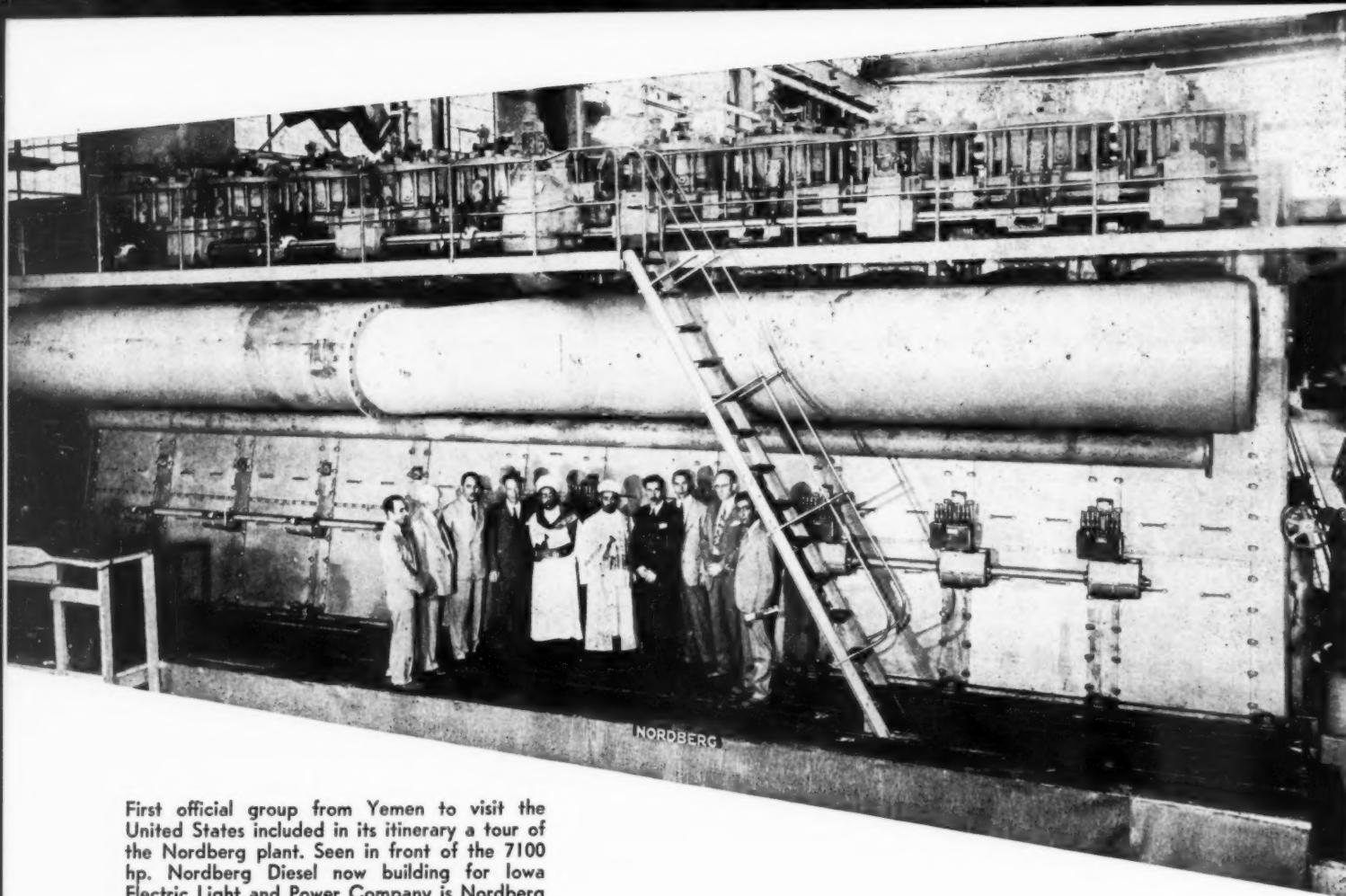
Contrast with Diesel, the big Diesel year of 1943, with 515 on order as of January 1, rose to 613 a year later and dropped sharply off to 400 and then 373 as of January 1, 1946, at the end of reconversion, but way up to 534 on January 1, 1947 and 765 as of July 1, 1947.

Since January 1, 1947, 63 steamers, 61 of which were freight, have been received by U. S. railroads, and 354 Diesels fairly divided between passenger, freight, and switch, plus 24 all-purpose Diesels that "can do anything."

The 1946 coal strike struck a mortal blow at the steam locomotive industry. Only liquefaction of coal into Diesel engine fuel will save the former railroad coal tonnage for the coal industry. Not even the coal turbine, replete with cyclone, ball mill and case hardened alloy blading will overtake Diesel . . . but perhaps jet propulsion or the atomic turbine will scare away Diesel orders periodically, in the next five years!

Until the railroad managements stop feuding with railroad labor the vast new field of railroad employment in a field directly competitive with trucks and buses, will be stymied and so will small-train usage of Diesels.

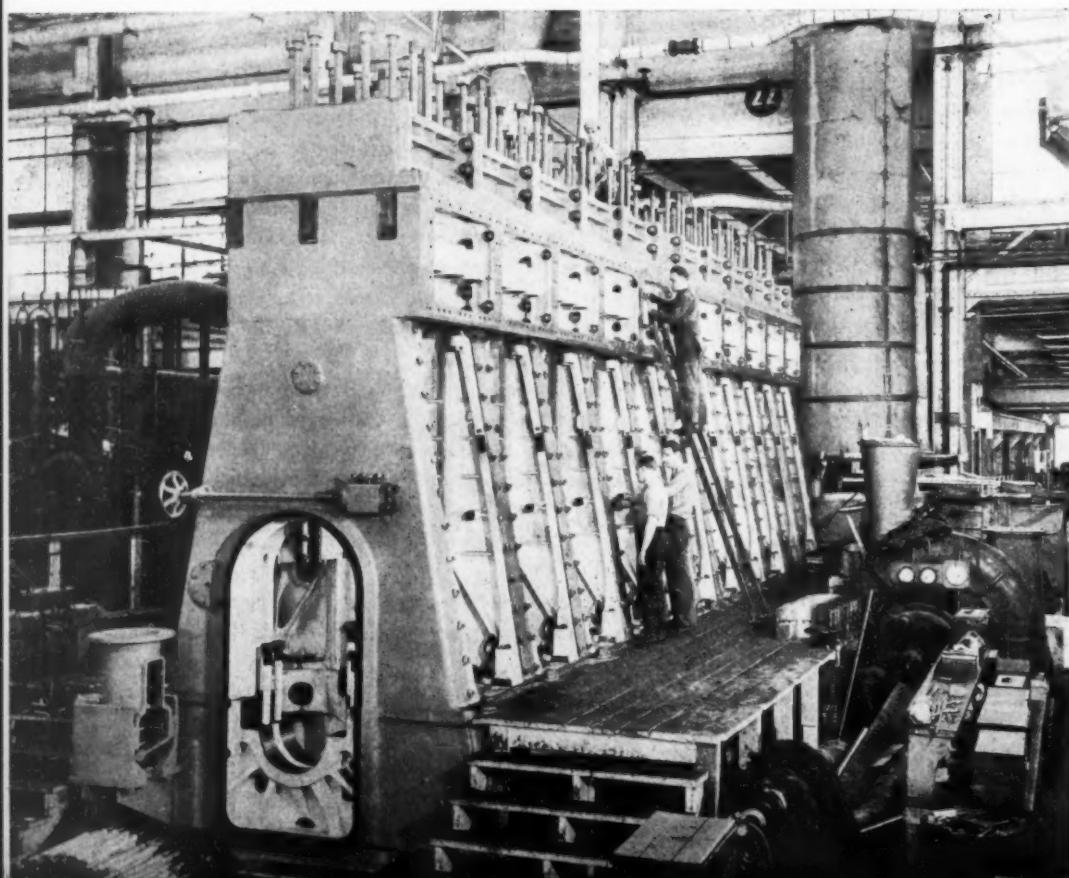
And so will the dream of H. L. Hamilton to . . . And now please turn to page 70 . . .



First official group from Yemen to visit the United States included in its itinerary a tour of the Nordberg plant. Seen in front of the 7100 hp. Nordberg Diesel now building for Iowa Electric Light and Power Company is Nordberg President, Robert E. Friend and on his left Prince Saif Al-Islam Abdullah. Others not identified.

## ANOTHER BIG DIESEL FOR MARSHALLTOWN, IOWA

Shop view showing framing of the big 10-cylinder while under construction.



**T**HE most powerful single acting Diesel engine generating unit so far built in America is now being installed in the Pedro-de-Valdivia power plant of the Lautaro Nitrate Corporation, Ltd., in Chile. This engine has a normal rating of 7100 horsepower at 164 rpm. and drives a 5000 kw., 6600 volt, 3 phase, 60 cycle General Electric generator and will be used for generating power required for the mining and processing of nitrate by this outstanding producer of this material. The engine has ten cylinders of 29 inch bore and 40 inch stroke. In the building of this engine Nordberg surpasses its previous record for building large Diesel units. During the war an engine of the same bore and stroke but with nine cylinders rated 6000 shp. at 160 rpm. with direct drive to the propeller shaft was installed in the MS Emory Victory. A duplicate of the 7100 horsepower engine is now under construction for the Iowa Electric Light and Power Company for installation in its Marshalltown, Iowa plant.

An idea of the size of this unit can be gained from the fact that to ship the engine alone, which weighed about 450 tons, 14 flat cars are required. The 5000 kw. generator of the flywheel type is among the largest generators built in this country for Diesel engine drive. The rotor is 176 inches in diameter and weighs 45

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tons, while the rotor spider weighs 30 tons. The stator is 20 feet in diameter. Both rotor and stator are split to facilitate shipment, especially on Chilean railways where the tunnel clearance is limited.

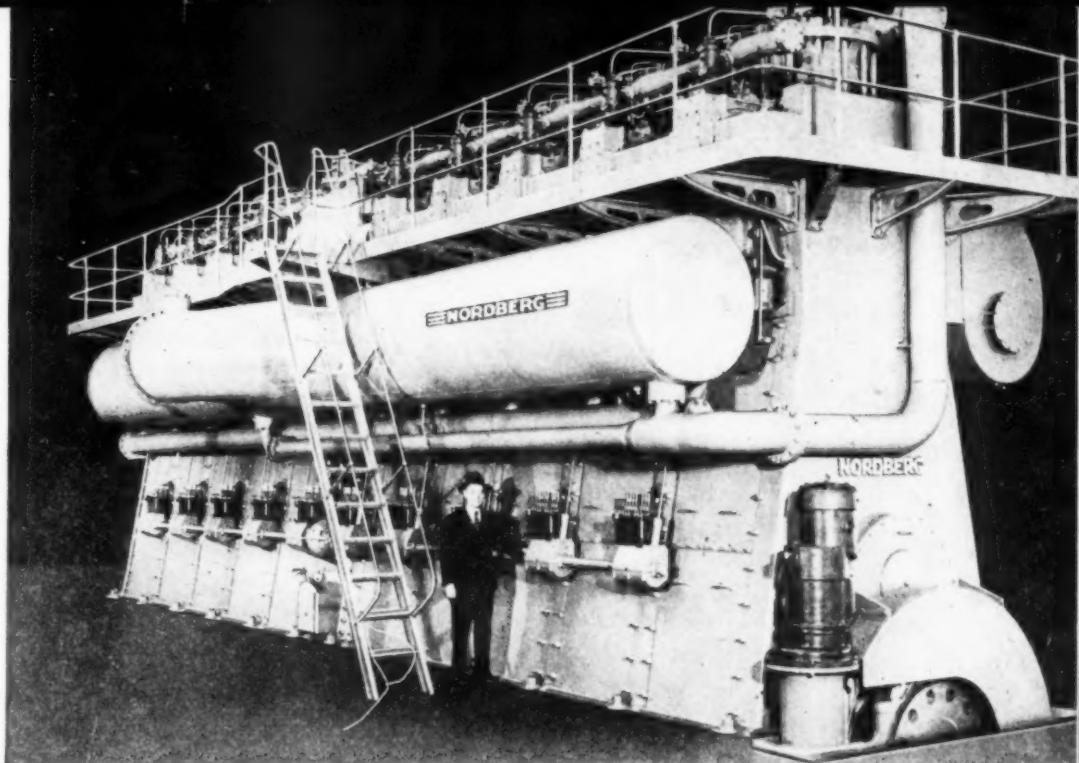
The design of this 7100 horsepower engine is similar to that of other Nordberg two-cycle engines. The bedplate is cast in two sections which are bolted together. The engine frame structure consists of a series of cast iron "A" frames bolted to the bedplate and support the cylinder blocks. The "A" frames are cored for tie rods which are anchored below and on each side of each main bearing housing in the bedplate and extend through the "A" frames and the cylinder blocks to form a rigid assembly. The tie rods are tightened by means of a special hydraulic jack to insure equal stress on all tie rods and assembled members. The tie rods take all stresses resulting from the working pressures in the power cylinder and relieve the "A" and cylinder blocks of tension. The separate cylinder blocks which contain the cylinder liners are doweled and securely bolted together, which with the tie rods form a rigid construction. Each cylinder is fitted with a separate cylinder liner.

The crankshaft is made in two sections, each section being a one-piece forging with five cranks. The crankpins and journals are 20 inches in diameter. The main and crankpin bearings are fitted with removable steel backed shells lined with centrifugally cast anti-friction metal.

This engine is of crosshead construction and has the crosshead guides bolted to the "A" frames. The pistons are of two piece construction, i.e., head and skirt. Piston heads of cast steel are cooled by circulation of a large quantity of oil at high velocity through labyrinth passageways cast in the head. The piston skirt rests upon a flange of the crosshead which centers it. This construction provides an easy means of removing the piston without disturbing the crosshead or connecting rod. The crosshead pin bearings are one piece, copper-base alloy bushings.

Each power cylinder is provided with a seven feed lubricator driven from a layshaft located at a convenient height above the floor and so timed to deliver lubricating oil to each power piston at a predetermined point in its stroke. The bottom of each cylinder liner is fitted with internal expanding wiper rings.

The lubrication system is of the pressure-feed type which delivers oil under pressure to all



Largest single-acting Diesel generating unit built in this country, this Nordberg Diesel stands three times the height of average man.

working parts of the engine through a header located in the crankcase. The crankshaft is drilled to conduct lubricating oil to the crankpins, crosshead pins and to the oil-cooled piston heads through a drilled passageway in each connecting rod. Oil from bearings, gears and piston heads return to the sump from which it is delivered by a motor-driven pump through a shell and tube type oil cooler and a filter to the main lubricating oil header in the crankcase.

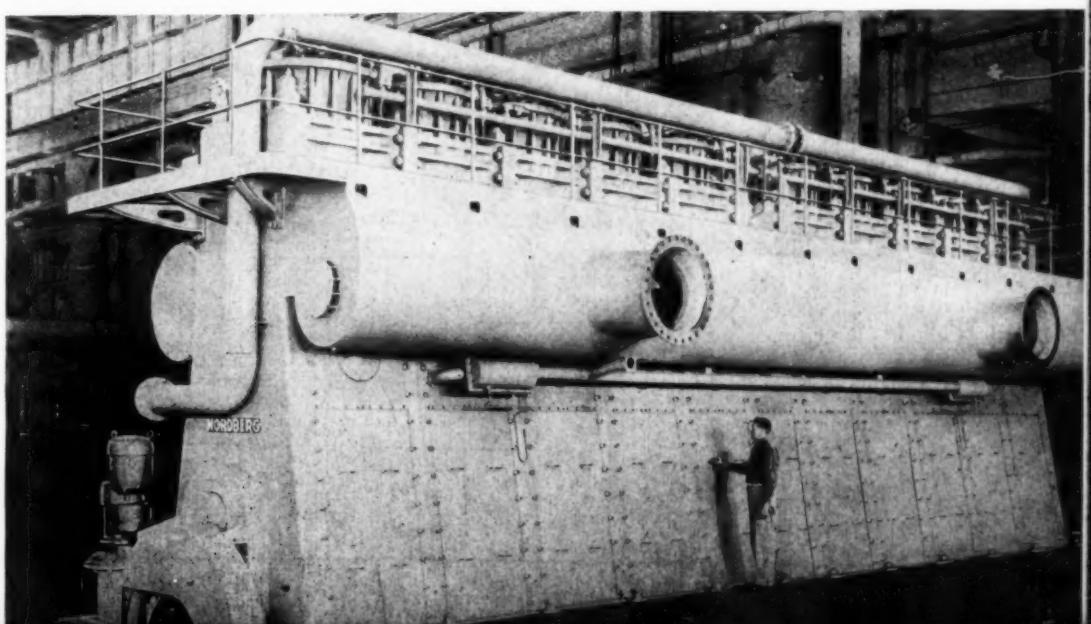
One of the principal differences of this engine from other Nordberg two-cycle engines is the location of the camshaft and fuel pumps. The camshaft is located overhead, but the engine controls are placed so the engine can easily be controlled from the floor. The individual American-Bosch fuel pumps are mounted directly over the camshaft, adjacent to the cylinder which each pump serves. By using an overhead camshaft the fuel injection lines are short.

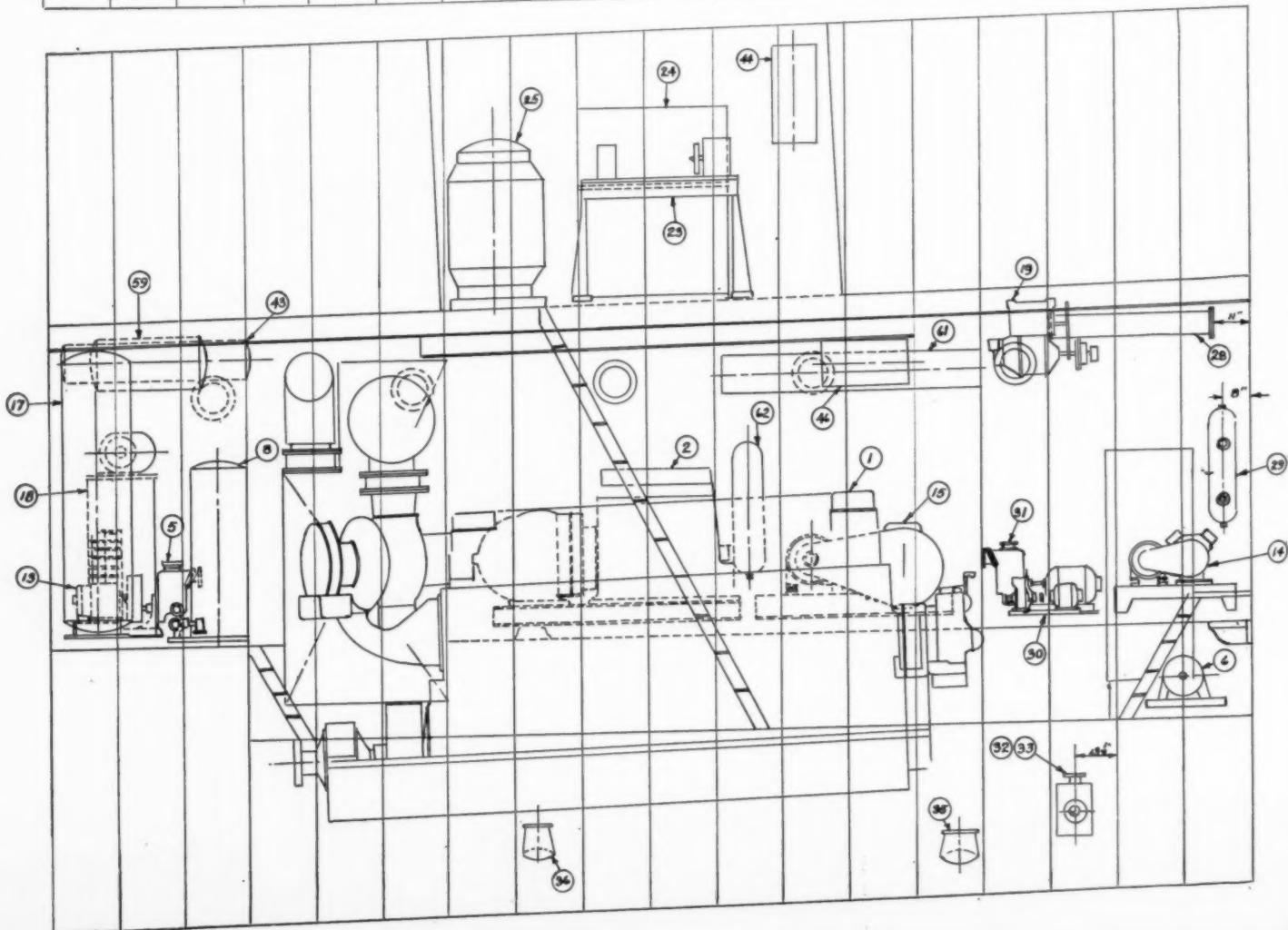
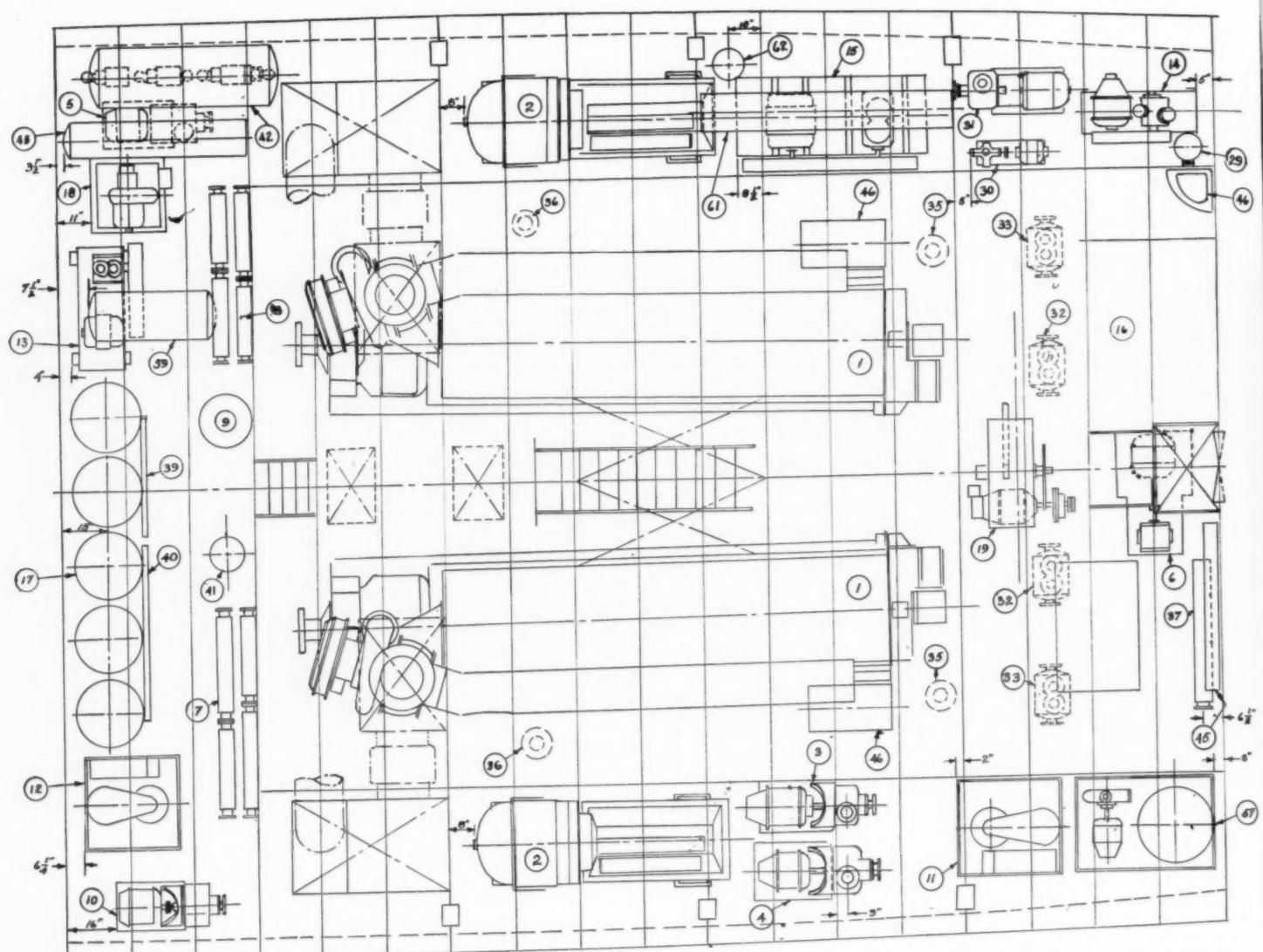
Scavenging air is furnished by a motor-driven blower. The scavenging header contains the automatic plate valves adjacent to the scavenging ports of each cylinder and prevent back flow of exhaust gases and contamination of incoming scavenging air. This same automatic plate valve design has long been successfully used on two-cycle engines built by Nordberg.

Unusual accessibility has been provided in the design of this large engine. Readily removable covers enclose the space between the "A" frames and allow easy access to the crankcase from either side of the engine for inspection and maintenance.

Tests with this type engine have indicated a low fuel consumption of .38 pounds per bhp. hour including the power to drive the scavenging blower even when using heavy fuel. Fuels up to 1500 ssu. at 100°F. have been burned successfully.

Exhaust side of the engine is marked by crankcase access doors of ample size and clean lines.





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SEPTEMBER

# THE HAIDA-A SPORTSMAN'S YACHT

By BRUCE C. SISSON



Airplane view of the "Haida", largest and most luxurious post-war yacht—powered with a pair of Enterprise 1100 hp. Diesels, Elliott-Buchi turbocharged. She is from the boards of John H. Wells, Inc., and was built by Bath Iron Works.

DURING this month the newest and most completely equipped Diesel yacht ever built will leave her home port on the West Coast and head for the game fishing waters of Alaska in search of the wily tuna and salmon. On board as owner will be Major Max C. Fleischmann of Glenbrook, Nevada, prominent sportsman and yachtsman. Major Fleischmann has owned many yachts but the *Haida* stands alone among them.

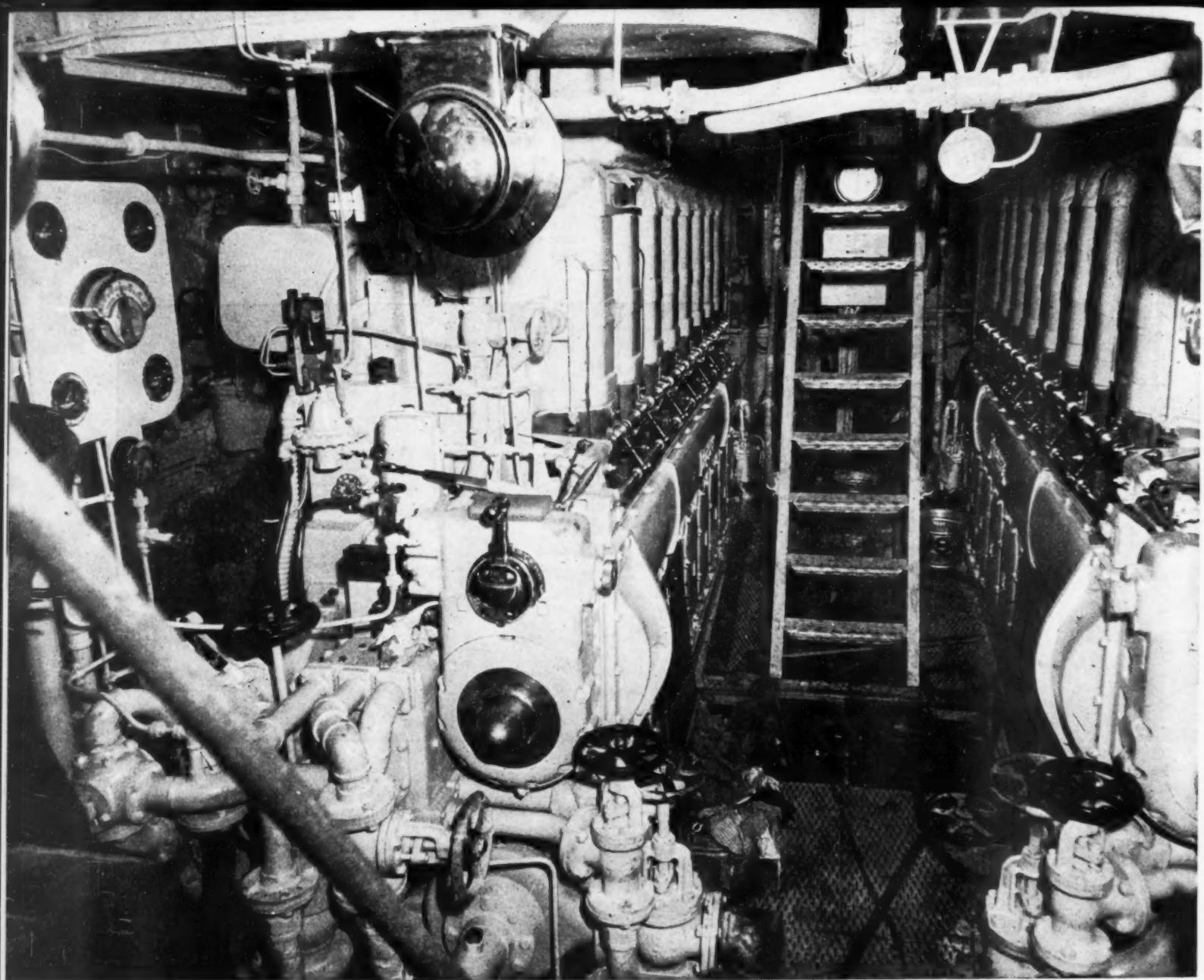
Facing page, top: Plan view below main deck. Bottom: Elevation at center line looking to port. 1: Enterprise main Diesels rated 1150 hp. each at 550 rpm. 2: Auxiliary generators by Reiner with Hercules Diesels. 3 & 4: Fire and bilge and general service pumps by Carter. 6: Quimby lube oil pump. 11 & 12: Sharples lube and fuel purifiers. 25: Sperry Gyro Compass. 32 & 33: Harrison lube and water coolers. 35: Main sea chests. 41: Fresh water filter. 45: Pneumercator board. 47, 48, 49: Motor generator sets for radio, radar and fathometer. 58: Motor generator for Sperry steering gear.

From truck to keel, the 166-foot *Haida* is truly a sportsman's yacht, ruggedly built, fast, and with excellent sea keeping ability. Her cruising range of 6,000 miles, her great water capacity and her ample storage and refrigerating space enable her to stay at sea months at a time. The *Haida* was designed by John H. Wells, Inc., New York and was built by the Bath Iron Works at Bath, Maine. Her keel was laid in late 1946 and she was launched on May 3rd, 1947. In August she passed her acceptance trials and began her trip south through the Canal to the West Coast.

The *Haida* is 166 feet overall, with a beam of 25 feet and a draft of 9 feet 6 inches, loaded. She is of welded steel construction, her hull plating varying from  $\frac{1}{2}$  inch to  $\frac{3}{8}$  inch. Her decks are teak. She is powered by two 1,100 hp. Enterprise Diesels for a top speed of 16 knots. Her cruising speed is 15 knots with the Diesels operating under 80% load. She is the fastest Diesel yacht in her class. As a matter of fact during her first trials with all tanks full and with a supercargo of 75 passengers she turned up to 16.4 knots.

Within the confines of her hull, the *Haida* carries an array of equipment that is not dupli-

cated in ships twice and three times her size. Her power plant alone is comparable to that of a much larger ship. Her 18,000 gallon fuel capacity and 12,000 gallon fresh water tanks put her far out of the class of conventional yachts. The *Haida*'s storage battery system is something entirely novel in yacht design. It stems from Major Fleischmann's order that while at anchor or tied up to a dock, no machinery should turn over from seven o'clock in the evening until eleven o'clock the following morning. The result was an exceedingly large battery installation to carry the ship's load for 16 hours at a time. This load includes that of the air conditioning system, refrigeration, gyrocompass, radio, pumps, and lighting. The Electric Storage Battery Co. handled this job with a 56-cell 110-volt installation, with each 2-volt cell weighing close to 600 pounds. These batteries are located aft in a separate compartment. To handle the electrical load underway the *Haida* is equipped with two John Reiner 40 kw. Diesel generating sets powered by Hercules 6-cylinder engines. The battery system floats on the line with the batteries coming to the aid of the generators under overload conditions. The battery automatically and instantaneously feeds into the main bus during peak loads. The procedure is reversed when the



Operating ends of main Enterprise Diesels in which aluminum is generously employed for weight reduction. Great care was taken to make this an unusually clean engine installation which is belied by this view taken during the outfitting.

Seen here

generators are operating under less than full load and the batteries are charged. Generally speaking, of course the Diesels charge the batteries the entire time they operate, there being adequate generating capacity to carry the full ship's load.

The hull is divided into 4 watertight compartments, with the engine room bulkheads both oil and watertight. All bulkheads are insulated and soundproofed with fibre-glass. The deck house including the pilot house is of aluminum construction, a factor which reduces considerably the topside weight of the vessel and improves her stability. Above the main deck again all bulkheads and compartments are fibre-glass insulated thus permitting the effective use of air conditioning.

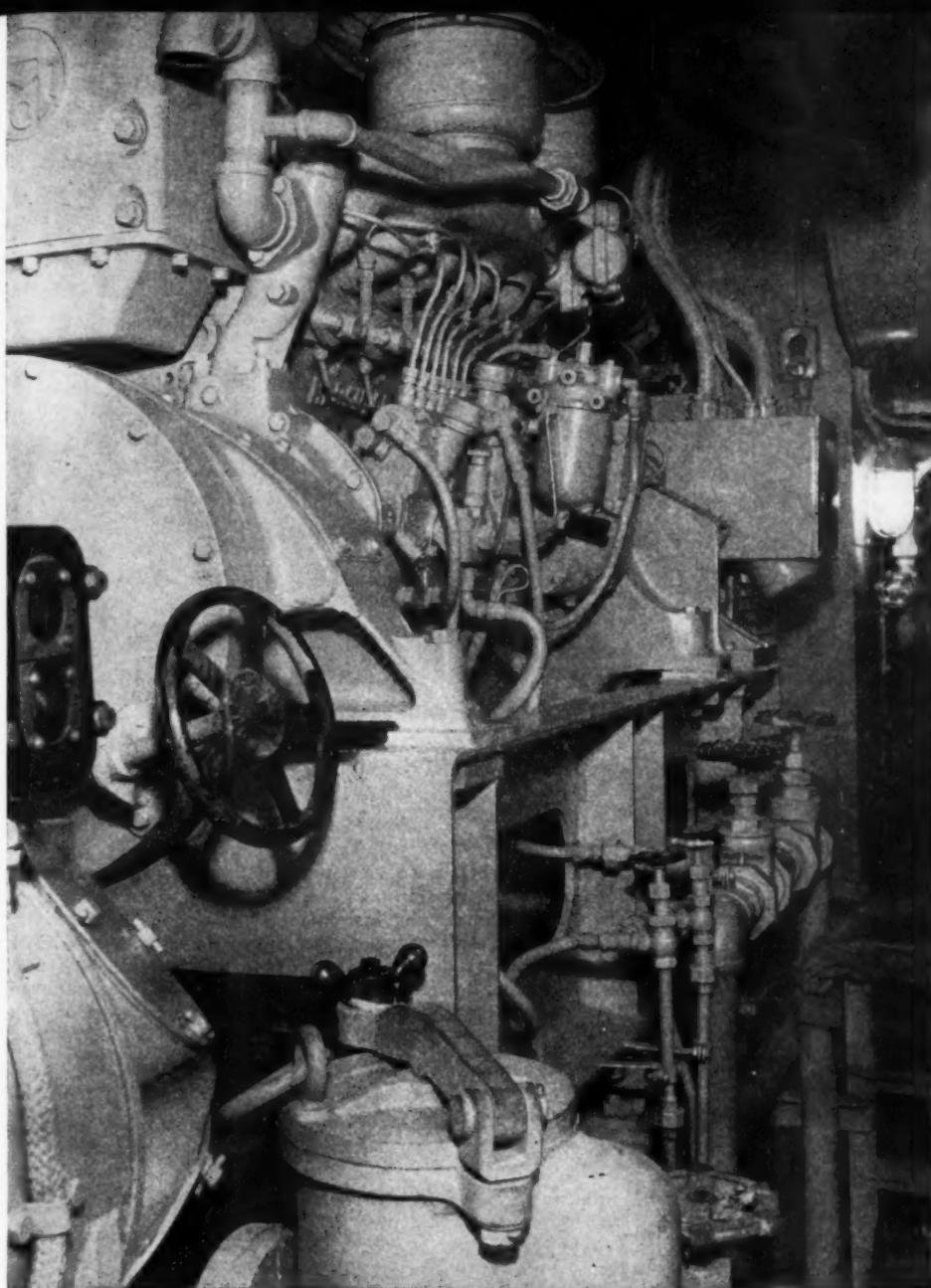
Looking at the vessel at her Bath outfitting dock, prior to her trip to the Pacific, one was impressed by her sleek appearance, her light blue hull and her white superstructure blending to make an imposing picture. Forward her cruiser bow widens at main deck level to accommodate the trim deck house. The dining room is at main deck level forward. It extends aft the full width of the deckhouse to the pantry. Aft of the pantry is the Captain's cabin and bath flanked port and starboard by the fishing gear room and the radio shack. Connecting stairs lead directly to the bridge above from the Captain's quarters. Next, the engine casing, consisting of insulated aluminum bulkheading, extends the width of the deckhouse except for the width of the inside passageway which connects the dining room and the after salon and

intervening compartments. The ship's office is located aft of the engine room casing just about amidships. The Main Salon, 27 feet long makes up the remainder of the deck house.

Below decks, entering from the Salon stairway aft are the owner's quarters. The owner's stateroom extends the width of the yacht. The adjoining stateroom for Major Fleischmann's personal physician who will accompany him during his extended cruises, is located just forward. Both state rooms have private baths. The guest quarters are located forward of the owner's and consist of a single and a double stateroom with connecting bath. The galley is located to starboard forward of the engine room with the deep freeze and refrigerators to port followed by the quarters for the ship's officers, five in-

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Seen here is one of two Hercules Diesel auxiliary generating units fitted on the "Haida". They were supplied by John Reiner and Company.

dividual cabins. The crew's quarters are in the forward part of the ship.

The engine room is located amidships and is isolated from the living spaces by soundproof water and oil tight bulkheads—steel below the main deck, aluminum, above. The main engines stand out immediately. These big Enterprise Diesels were specially built for yacht service. During construction special care was taken to reduce the engine weight wherever possible. As a result the total weight of each engine is approximately 37,500 lbs. as against a standard 53,000 lbs. for the Enterprise regular marine model. A large factor in this reduction of weight was in the fabrication of steel engine bases. Cast aluminum was used for gear cases and various other covers. The Diesels are 8 cylinder

with a bore of 12 inches and a stroke of 15 inches. Supercharged by an Elliott-Buchi turbocharger they develop 1,100 hp. each at 550 rpm. They each drive a propeller. They are equipped with Harrison heat exchangers and Bendix-Scintilla fuel injection equipment.

Along the aft engine room bulkhead on the tank top deck are five starting air tanks which supply air for the main engines. Also on this platform are the Sharples fuel oil centrifuge, the Curtis auxiliary air compressor and the Carter fresh water and fuel oil transfer pumps. Located to port and starboard on this same tank top platform are the two auxiliary Diesel sets. Just aft of the two auxiliaries are the exhaust sump tanks which are integral parts of the Scully MacLachlan underwater exhaust

system. This system eliminates any exhaust odor or noise since all exhaust gases are released from below the water line and come to the surface well astern in the wake of the vessel.

Forward, on the port side of the engine room are the Freon compressors for the refrigerating and air conditioning systems, while opposite on the starboard side is the Sharples lube oil centrifuge. On the engine room flat just forward of the main Diesels is the Sperry steering engine. At the main deck level of the engine room are the Sperry Gyro Compass, Walter Kidde fire fighting equipment and a working area complete with workbench, lathe, grinder, and drill press.

When the question of electrical power comes up the *Haida*'s electrical equipment should be discussed. She is probably better equipped than any yacht afloat. She has Raytheon radar, a Sperry Gyro Compass with automatic pilot, two RCA ship to shore phones, (there is one installed in the owner's fishing launch), and a fathometer by the Submarine Signal Company. In addition to this equipment she has been fitted with electrolysis eliminators which will prevent electrolytic action between the bronze of the propellers and rudder and the steel hull. She is equipped with the first yacht installation of Weylin Davits and even these are electrically operated.

The *Haida* carries five boats on her boat deck: two cabin motor launches, one for the crew and one specially outfitted for fishing with sleeping quarters and galley; two life boats and a canoe.

The crew of the *Haida* are men who have sailed with Major Fleischmann on many cruises in the past. Skipper David Welch and Chief Engineer William Darach head up the seventeen experienced yacht sailors aboard the *Haida*. They've been with the Major for years and they think the world of him.

The interior decoration of the *Haida* was done by Fred Vogel of New York City. All public rooms are attractively finished, the dining room in Primavera and the others in natural teak.

The present *Haida* is replacing a 127-foot Diesel yacht which was completed for Major Fleischmann during the early months of World War II, and also designed by John H. Wells, Inc. Before Major Fleischmann ever had a chance to operate this boat the Government took it over. This vessel is still in use by the Navy in testing out new secret devices, and is one of the fastest small Diesel vessels in service.

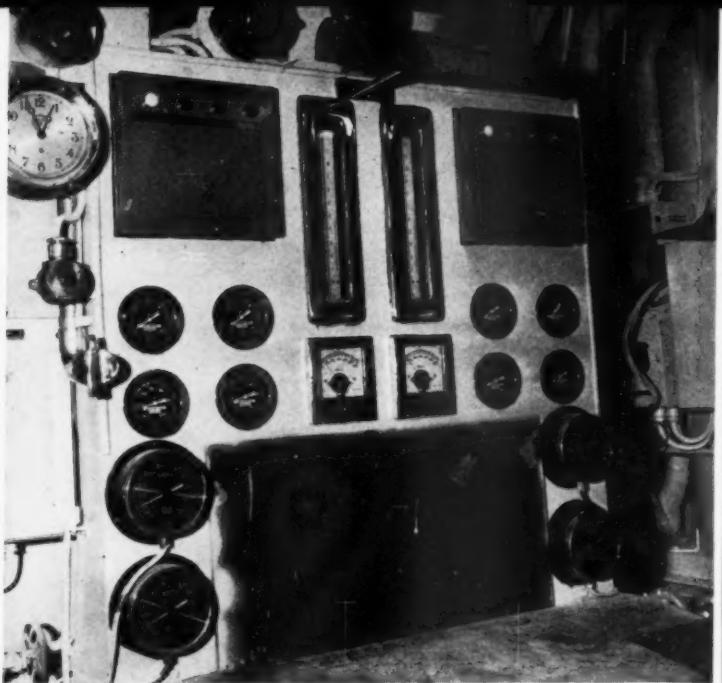
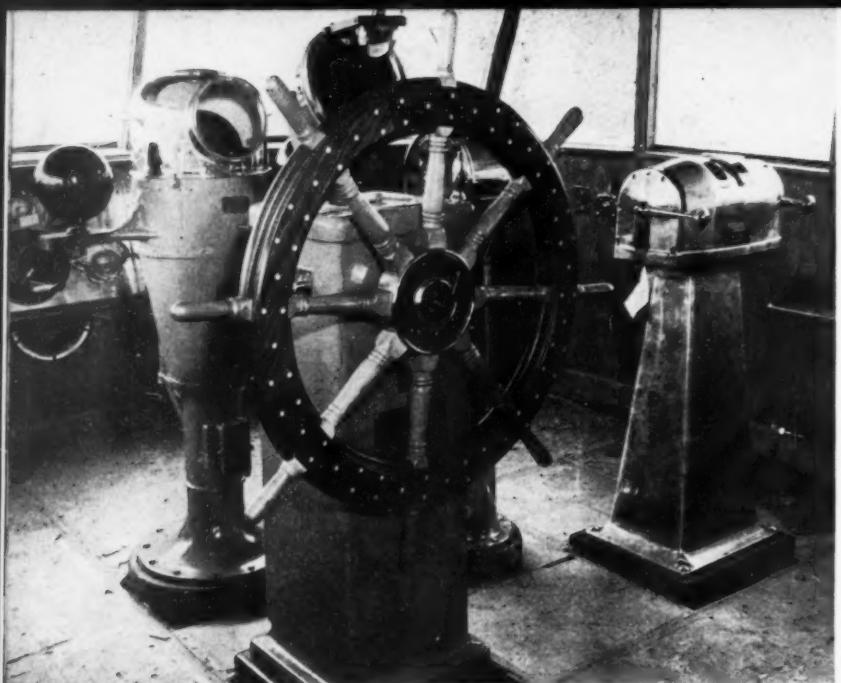
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Upper left: Wheelhouse view showing Enterprise engine control stand, right and Weston port and starboard engine tachometers, left. Above: Engine room instrument panel with Alnor pyrometers center, flanked by pressure gauges above which are alarm panels and tank gauges. Left: The radio room is complete with communication and navigational equipment. Lower left: Typical guest stateroom on the "Haida." Below: Sperry gyro compass on main deck.

# DIESEL ENGINES IN CALIFORNIA OIL DRILLING

By DWIGHT ROBISON

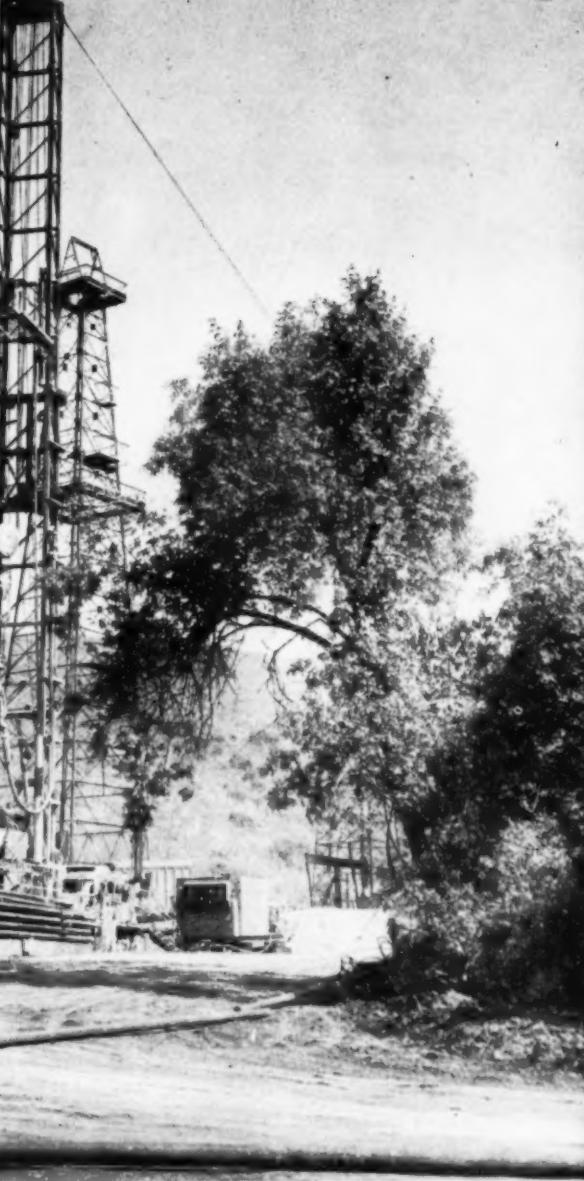
**D**IESEL engines have invaded the California oil fields in all sizes from two cylinder, 50 hp. engines up to 24 cylinder Quad engines capable of developing 600 horsepower. These engines are being used in many ways ranging from small compressor drives up to drilling rigs capable of drilling to beyond 12,000 feet. In the past, California has been blessed with an abundance of natural gas which made cheap fuel for combination fuel engines. Natural gas is now needed to supply essential industry and Diesel engines are providing the oil companies with a means of conserving their gas.

Other important developments were also influential in speeding up the swing to Diesels. Light weight, high horsepower engines made it possible to utilize Diesel engines on portable rigs; hydraulic couplings and torque converters allowed the operators to maintain normal operating speeds on their engines, reduced fire hazard was an important feature on dangerous rework jobs and reduced engine maintenance helped make Diesel operation economical.

Diesel engines have been applied to every phase of drilling and well servicing. Small two cylinder 50 hp. engines are used to drive air compressors on semi-trailer-mounted production hoists. Compressed air is used for starting larger engines, operating air tubing slips and air tubing tongs and for air sprays used in clean up work. Larger Diesels perform the same function of larger drilling rigs where light weight and compact power units are not as important as on trailer mounted production units. Diesel driven generators are common in several sizes with 10 kw. and 15 kw. being the most common but there are several operators utilizing 6 cylinder 150 hp. Diesel engines to drive 30 kw. generator sets. One large contractor has equipped his largest Diesel drilling rig with two 30 kw. generators each driven by 150 hp. engines. The two complete motor generator units are mounted in a steel house to protect the units and speed up moving.

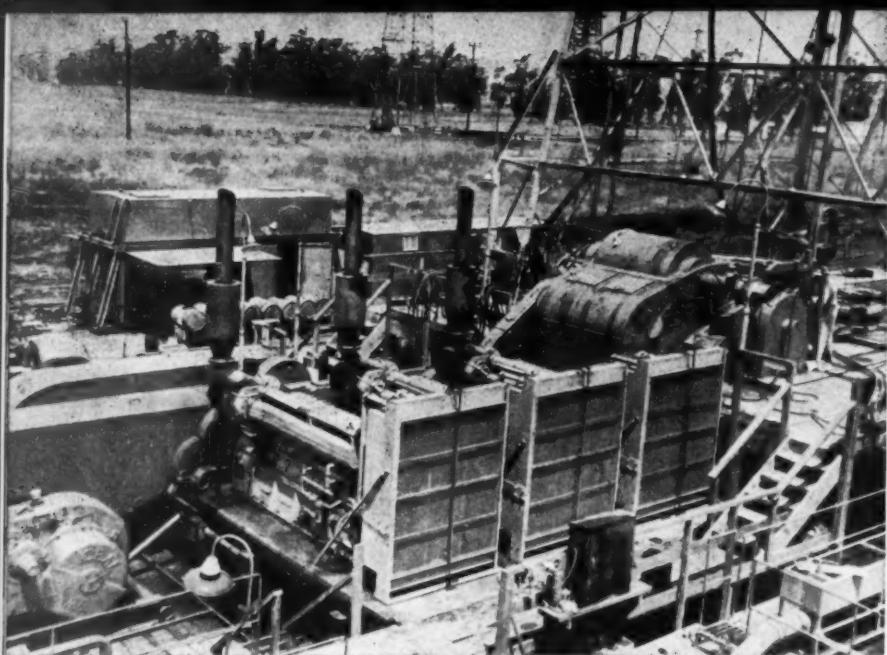
Semi-trailer and truck-mounted production hoists are now able to utilize Diesels. Most of the hoists equipped with these high speed engines are also equipped with hydraulic torque converters which insure high speed operation of the engine despite the load imposed on the converter output shaft. Use of the converter prevents low speed overloaded engine operation and adds greatly to the life of the engine. The production hoists utilizing Diesels range in size from 4 cylinder, 100 hp. units capable of servicing wells to a depth of 4000 feet up to heavy duty units powered by 12 cylinder engines developing 300 hp. and capable of servicing the deepest wells in the state.

The heavy duty production units equipped with



This Ideco Rambler rig, owned by Santa Fe Drilling Company is powered with a General Motors 71 twin Diesel unit.

300 hp. engines are also used for moderate drilling. The complete drilling unit is mounted as a rambler rig with the engine, hoist and quick-lift mast all mounted on a semi-trailer. Units of this nature with slight modifications can economically drill to depths in excess of 3500 feet and they can be prepared for drilling within a few hours after they are moved into a drilling location. The drilling units are often accompanied by semi-trailer mounted slush pump units which are also powered by light weight high speed Diesel engines. It is good practice to mount two engines and two pumps on a single semi-trailer and due to developments in light weight engines this type of mounting can be made within California legal road weight limitations.



Here is seen a Hayes & Sprague Drilling Rig powered by three Sterling 600 hp. turbocharged Diesels driving through Fawick Airflex clutches.

Moderate drilling units generally include three or four medium weight Diesel engines developing about 250 horsepower per engine. On the three engine units it is customary to have all three engines compounded into a single main hoisting drive to insure adequate power for speedy hoisting of 6500 to 7500 feet of drill pipe. While drilling, the engines can be separated for efficient operation of the rotary table and also the slush pump. On rigs of this nature it is not common to employ any hydraulic device for absorbing shock loads and keeping the engines operating at speeds rated but the engines still perform satisfactorily. No trouble has been encountered in synchronizing up to four Diesel engines into a single drive with either chain or Vee belt drives.

Moderate capacity drilling units powered by Diesel engines are the ones with the longest operational history in California. Some of the units purchased over 10 years ago are still drill-

ing wells and making money for drilling contractors and the original engines are still in use.

Similar economy of operation from the light and heavy units is indicated by the performance to date.

The new modern heavy Diesel engined drilling units are among the most interesting in the State and they provide many satisfactory combinations of rigs. One of the most modern is operated by a contractor drilling in the deep Ventura field. This is one of the fields requiring perfect control at all times and three Diesel engines on the drilling unit and one Diesel engine operating a generator provide the control desired. This contractor has selected two 24 cylinder Quad engines for his main hoisting engines. The same engines are separated into two separate power packages consisting of a single Quad each for driving the power pump and the rotary table while drilling. The Quad

This and the adjacent illustration, right, show a National Solidated 12

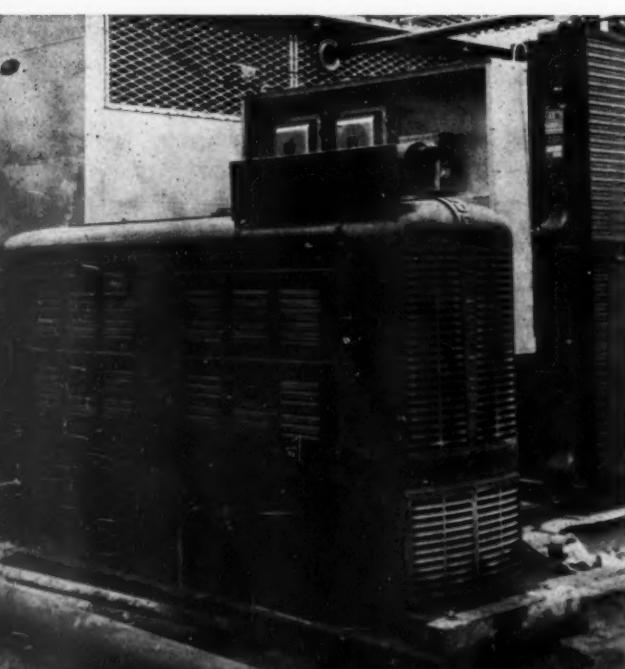
assembled for Rocky Mountain Drilling Company who plan to

due to the equipment the engine Diesel contractor and less drilling e

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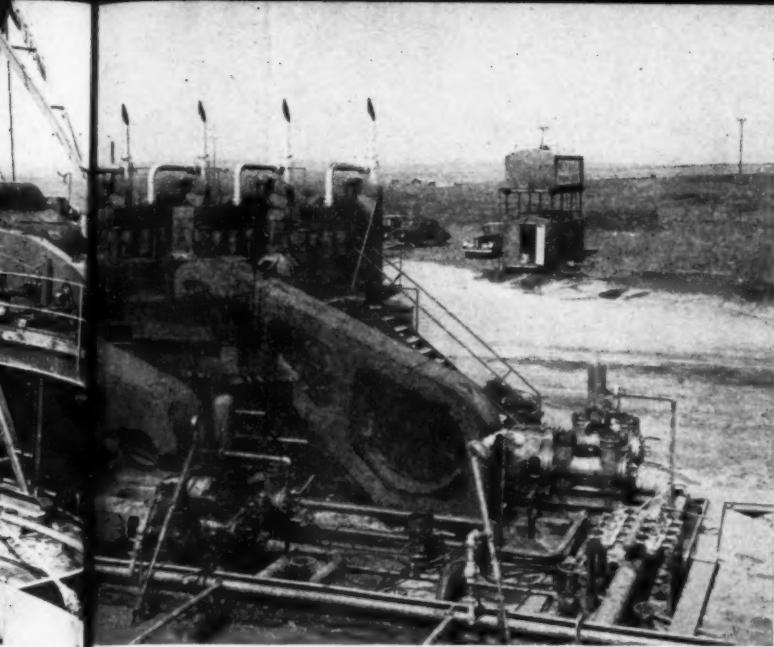
A Buda 30 kw. portable Diesel-generator set used by Bell and Burden at Ventura, California.



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This and the illustration right, across the page combine to an Emsco drawworks table used California for moderate depth drilling. Power is supplied by two Caterpillar 150 h.p. Diesels.

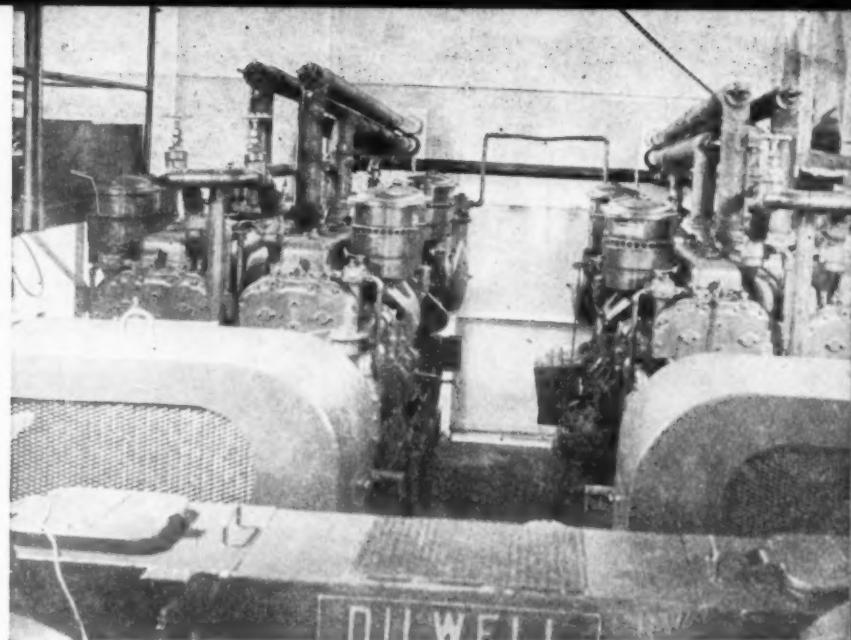




National Consolidated 125 rig powered by four Superior Diesels. Outfit was to plan to drill in excess of 12,000 feet.

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A pair of General Motors 71 Quads, seen here, develops over 1000 hp. for Bell and Burden's new Oil Well Supply Co. drawworks.

due to the compact nature of the compounding equipment and sturdy steel skids upon which the engines are mounted. Even the heavy duty Diesel engines are not a problem for the oil contractors to move as they are much lighter and less bulky than other portions of the drilling equipment.

Many other typical heavy duty Diesel rigs could be described from the rig now operating in Washington which is powered by a new design Diesel that operates effectively on either liquid fuel or natural gas, to the many rigs of several makes and characteristics operating in some of the deepest fields in the prolific San Joaquin Valley. Although these rigs all have differing construction details and employ many various makes and types of Diesel engines they are all drilling oil wells effectively and without trouble.

It is difficult to determine the one feature of Diesel engines that has led to their selection

but all agree that they provide trouble-free rig operation and splendid hoisting characteristics.

Deep wildcat drilling is becoming more common in California and several drilling contractors turned to Diesel to provide them with dependable power and a fuel that is easy to obtain and store at remote locations. Diesel engines have replaced gas engines in some of the fields where natural gas is now demanding a premium. With the expanding industrial activity in California it is impossible to provide natural gas from local fields for all existing demands and the oil companies are curtailing their own use of natural gas for drilling power in favor of Diesel oil burning engines.

Many of the smaller Diesel engines are being used on production hoists. These engines operate near wells that often discharge considerable gas, producing a fire hazard at the well. Diesel engines eliminate the fire danger from faulty

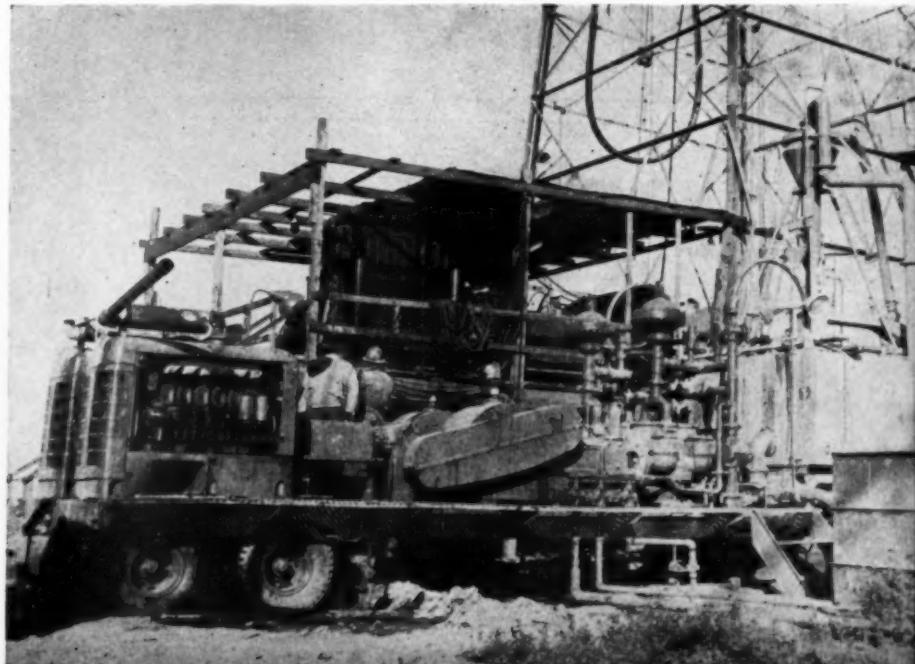
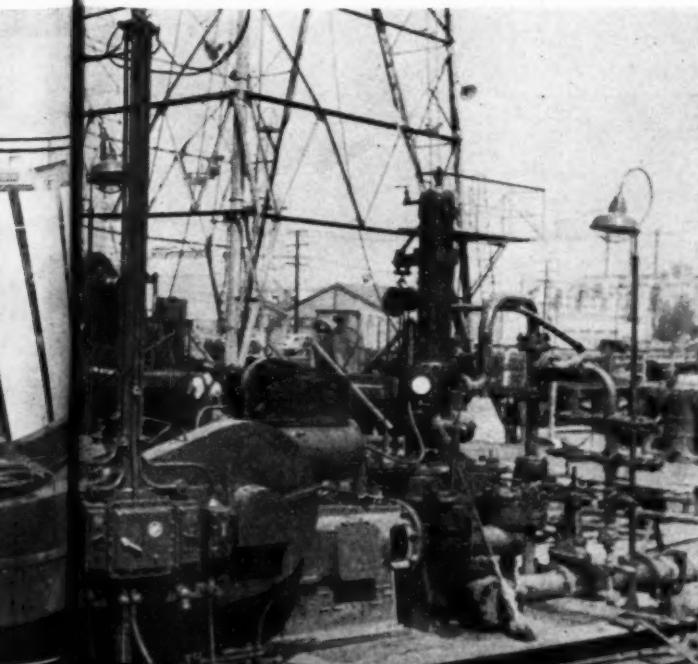
ignition and this feature has been a big factor in their selection on production hoist work. It is also practical to reduce the exhaust temperature of modern Diesel engines to well below the flash point for common petroleum gasses and further reduce the fire hazard when running.

Diesel engines have invaded all phases of California drilling and production work and the prospects are that the invasion will continue.

Within the past year several large drilling contractors have placed their first Diesel rigs in operation and some have already placed repeat orders. The many interesting operational features of Diesel engines along with the shortage of natural gas for fuel has speeded the swing to this type of power. New light weight engines will open up an entire new field in mobile Diesel units and this should be one of the most interesting applications.

drawworks table used by General Petroleum Corp., at Wilmington,  
Caterpillar & Mins Diesels.

Two General Motors 71 Diesels and two Gardner-Denver slush pumps  
mounted on semi-trailer used by Apex Petroleum Corp. near Bakersfield,  
California.





# DIESELS HAUL NEW OLYMPIAN-HIAWATHAS THROUGH AMERICA'S LONGEST ELECTRIFIED ZONE

By CHARLES F. A. MANN



Three-unit, 6,000 hp. Fairbanks Morse Diesel hauling Olympian Hiawatha near Tacoma, Washington.

**D**ISEL railroad horizons on "bigger and better" scale continue to open up in America's vast railway network . . . pushing back steam and electricity as its simplicity and black-ink economics challenge the age of speed and help keep the nation's biggest transportation unit at the forefront of progress.

June 29 the Chicago, Milwaukee, St. Paul & Pacific Railroad known around the U.S.A. as the Milwaukee Road, began daily service between Chicago-Seattle-Tacoma with a fleet of 6 complete new Olympian-Hiawatha trains, first

big postwar extension of the 12-year-old fleet of Hiawatha speedliners that have made such sensational profit records. Gradually the entire Hiawatha fleet of de luxe daytime speedliners becomes 100% Diesel operated—after that remarkable 4-sided test run of four years ago. At that time, hesitant top brass in the Milwaukee's management, reluctant to let go of steam entirely, set up a General Motors Diesel, an Alco Diesel, a coal burning steam and an oil burning steam locomotive quartet, to race for operating supremacy . . . Diesel won, as was anticipated.

The newest fleet of Hiawathas operates as a 3-class transcontinental 45 hour train, with no extra fare, with early afternoon arrival and departure in Chicago and morning arrival and afternoon departure from the western terminal cities of Seattle and Tacoma. Always pioneering and innovating in its own special manner, the cagey Milwaukee people first analyzed their operating picture.

From Harlowton, Montana, to Avery, Idaho, over the Belt, Rocky and Bitterroot mountains, the Milwaukee operates a model 440 mile elec-

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LOCOMOTIVE STARTING TRACTIVE EFFORT 166,300	MAIL CAR	BAG DORM	COACH	COACH	COACH	COACH TOUR COACH TOUR SECT SECT	TOURALUX	TOURALUX	LUNCH LOUNGE	DINER	BEDROOM ROOMETTE	BEDROOM OBSERVATION	
SEATING CAPACITY	-	-	52	52	52	24 16	28	28	44	40	22	16	
WEIGHT	980,000	102,400	106,300	113,100	113,100	113,100	120,200	119,300	119,300	122,800	130,000	135,000	
TOTAL WEIGHT OF CARS	1,410,100												
TOTAL WEIGHT OF TRAIN	2,390,100												
TOTAL CAPACITY - REVENUE PASSENGERS - 290													

From Avery to Othello, Wash., the line divides into a short freight main line straight across Washington, and a longer passenger line via Spokane, now nearing a 100% Diesel operation, but formerly oil fired steam.

From Othello to Tacoma, Washington, the Western terminus, another 220 mile electrified zone hauls mainline traffic over the Cascade range and its little brother, Saddle Mountain, to tidewater, after crossing the Columbia River at little more than 400 ft. above sea level.

Should the company purchase more electric locomotives, fast and powerful enough to haul the new speedliners, or should it shut its eyes to expansion of its electrification, even though cheap hydroelectric energy supplies the "juice?" The answer was, Dieselize right through both electrified zones and let the old electrics haul the regular trains.

So, America's longest electrified railroad goes Diesel to meet the challenge of 1947 railroading. The big Diesels cost scarcely more than General Electric or Westinghouse would have built straight electrics. And no more substation capacity investment to boost the 3,000 volt trolley current. Diesels were cheaper—despite the fact that Othello is but 60 miles from Grand Coulee Dam, world's biggest powerhouse.

Each Olympian Hiawatha consists of 12 light-weight cars, drawn by a 3-unit 6,000 hp. Fairbanks-Morse Diesel passenger locomotive between Minneapolis and Tacoma, and a 2-unit 4000 hp. F.M. Diesel between Minneapolis and Chicago, where grades are light.

The trains are unique in that they were designed and engineered at the Milwaukee's own

shops at Milwaukee, under famed K. F. Nystrom, one of the old masters in his field, and unique in that he not only heads up the Milwaukee's car building division, but is chief mechanical and motive power officer of the system. Everything the company builds is evolved from practical operating results. Ten cars of each of the 6 complete trains were built at Milwaukee shops, two of them, sleepers, because of Pullman patents, were built at the Chicago Pullman plant . . . and will not be completed until late in September.

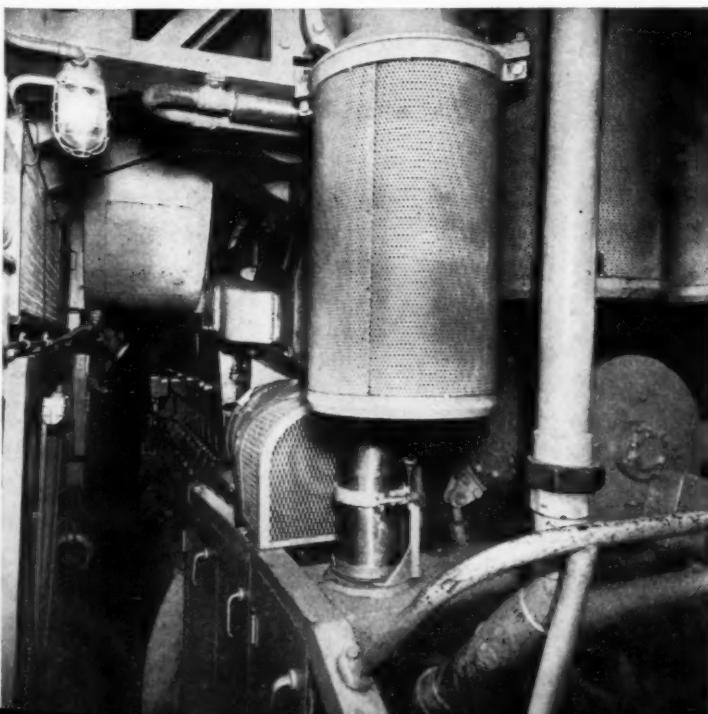
The first car is a 75 ft. mail and express car; next comes a baggage-dormitory car, with three 6-man sleeping compartments, conductor's office with P.A. control system, showers, toilets, wire record player, radio, etc., for the whole train. Next follows three 85 ft. deluxe day coaches, each seating 52, with luxurious washrooms, etc. Next is a coach-tourist sleeper, exclusively for women and children—half daycoach and half modernistic tourist sleeper. Next follows two 28 capacity touralux tourist sleepers—a traveller saves about \$30 on fare and berth charges from Chicago to the Coast in this second class accommodation. Next is a deluxe lunch, tavern-lounge car, with two separate sections forming a deluxe club car for coach and tourist car passengers—and a nifty little saloon in "wet" states! The big 40 seat diner is a dream in blonde woods, Formica panelling, angle tables cantilevered out from walls, fluorescent lighting, etc.

Next is a bedroom-roomette Pullman-built car and last is a bedroom-lounge car, likewise Pullman built. The Plexiglass dome over the rear compartment will give travellers a unique sky-angle view of the magnificent Western scenery and is a compromise on the Astra Dome cars.

The trains are highly original in interior design and color. Nobody can detect another train design like it in all of America. Long devoted to Indian motif, the Milwaukee went "modern Indian" on these latest versions of Hiawatha, utilizing browns and reds in fabrics, panelling and carpets. Formica panelling; sprayed steel sheets, varied wood veneers and employment of fluorescent lighting has given the new trains a distinctive look which is neither "Pullman" nor "Budd" in appearance. The darker woods are used in the big spaces, while the cream colored Formica panelling is in the narrow passageways. Every car is sealed from the inside with a rubber diaphragm stretched between the couplers, creating a soft, noiseless, dustproof passageway of smooth rubber when hopping between cars. Each car has a unique, high-capacity steam jet air conditioning system in the ends of the cars, where it is accessible for servicing while en route—without stopping to get "out and under." So is the electrical gear.

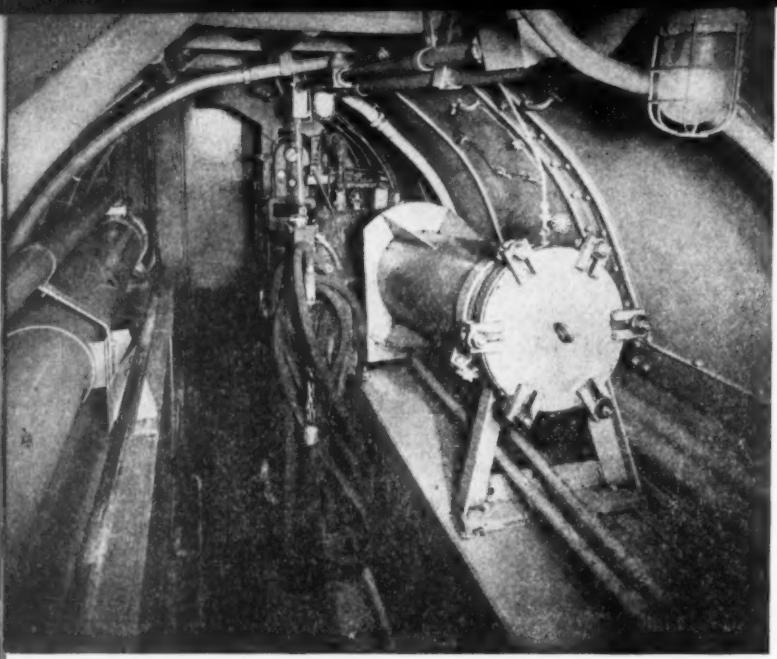
Mr. Nystrom is working on a unique scheme to take the curse off one of the very worst problems the mechanical and operating departments have in operating passenger trains. Fresh water supply. Hardly a locomotive or coach has been built that carries enough culinary and "neck washin'" water. Mr. Nystrom is experimenting with a device to take condensate from either the heating system in winter, or steam-actuated cooling system in summer, and, by small doses of compressed air, inject this water into tanks for re-use in the diner or coaches! This will effectively solve one of the disadvantages of the Diesel locomotive—water storage limitations . . . by making it possible to quickly water a whole train by merely loading the Diesel with boiler water—the condensate watering the rest of the train.

View from generator end of one F-M Diesel unit. Burgess-Manning Snubbers, foreground.



Auxiliary end of F-M Diesel unit. Left is Vapor-Clarkson Heating Boiler. Lube oil heat exchangers over water tanks each side of cab.





View of auxiliary compartment aboard Diesel unit from engine end showing  $\text{CO}_2$  fire equipment (center) and heat exchangers.

Electro-pneumatic braking for fast, quiet stopping, elimination of all mechanical frills and employment of Mr. Nystrom's patented 4 wheel truck, with  $8\frac{1}{2}$  ft. wide springbase, make these cars the quietest, most comfortable yet used in rough track territory in the West.

The Toulalux sleepers employ exactly the same standards of rest rooms, lighting, air conditioning, compartmentation, heating and window spread as the latest first class Pullman sleepers—at a big saving on the pocketbook. Pre-made berths with rubber and spring mattresses, folding ladders and all the gadgets attract thrifty travellers who are not yet financially up to the bedroom and roomette level. They are the only tourist sleepers to be operated by the owning railroad in the U.S.A. Gone are the castoff standard sleepers in tourist service.

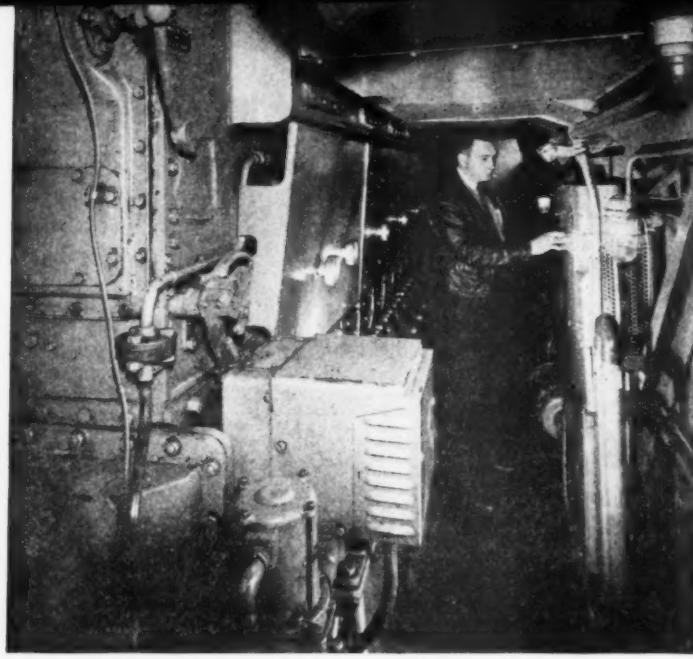
Barely 16 months ago the Union Pacific Rail-

road became the first to utilize a Fairbanks-Morse opposed piston Diesel locomotive. Now the Milwaukee, a friendly "Cousin" of the UP, over whose tracks it runs in several key spots including the Seattle and Spokane terminals, becomes the first U. S. railroad to completely Dieselize a whole fleet of transcontinental streamliners with F-M Diesels. Important modifications to suit Milwaukee's operating conditions have been incorporated in the 5 big 6,000 hp. F.-M. units and the one 4,000 hp. unit, including important changes in weights and capacities. The overall dimensions of 194 ft. 6 inches for the 3-unit locomotive; the double-ended cab layout to operate without turning; the 64 ft. 10 in. length of each of the 3 units and the 14 ft. 7 in. height from rail to roof is the same. Overall weight is down to 980,000 lbs. and weight on drivers cut back to 669,000 lbs. Fuel capacity has been cut down to 3,000 gallons and boiler water capacity raised

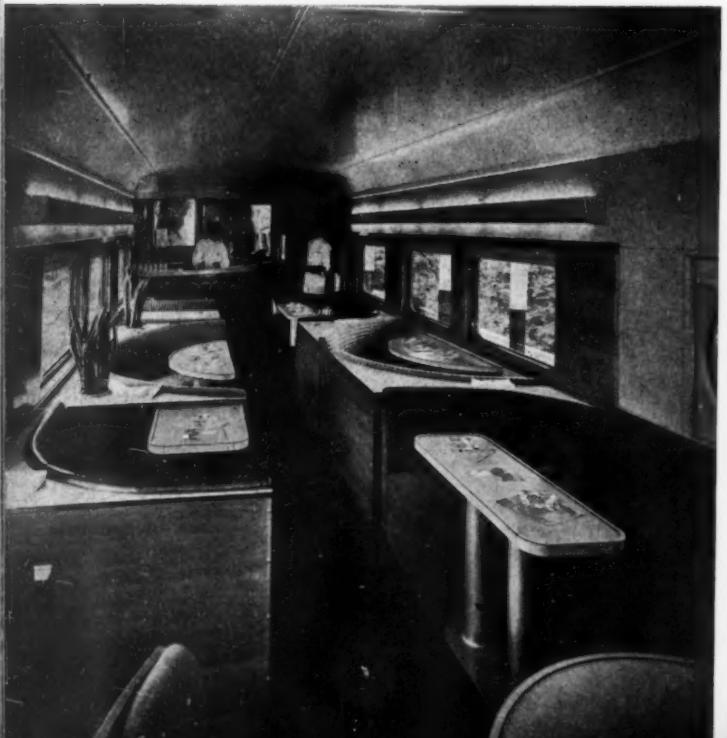
to 5,000 gallons to care for the heavy winter heating loads and summer steam jet air conditioning loads. A hot summer run will use as much steam for cooling as a cold winter run will for heating.

The writer of this article rode from Tacoma to Othello in the cab. It was an eye-opener indeed. We ran with the throttle in but the 6th notch to avoid overspeed when climbing the Cascade Range. The whole train is over-powered and up to 16 or 18 lightweight cars can eventually be handled behind one locomotive without helper, up the 1.7% and 2.2% mountain grades, on the 45 hour schedule. But the regenerative (dynamic) braking system is ample to hold down the train speed to 15 mph. if needed on the 2.2% grades without a single application of the air. On the 17 mile Beverly Hill—a continuous 2.2% downgrade, this is a vitally useful factor.

Control panel for 2000 hp. Fairbanks-Morse unit. Milwaukee road has five of these big 3-unit Diesel locomotives.



Luxurious Lounge-Bar Car of the Olympian Hiawatha.



Modern, panelled Dining Car for the Hiawatha

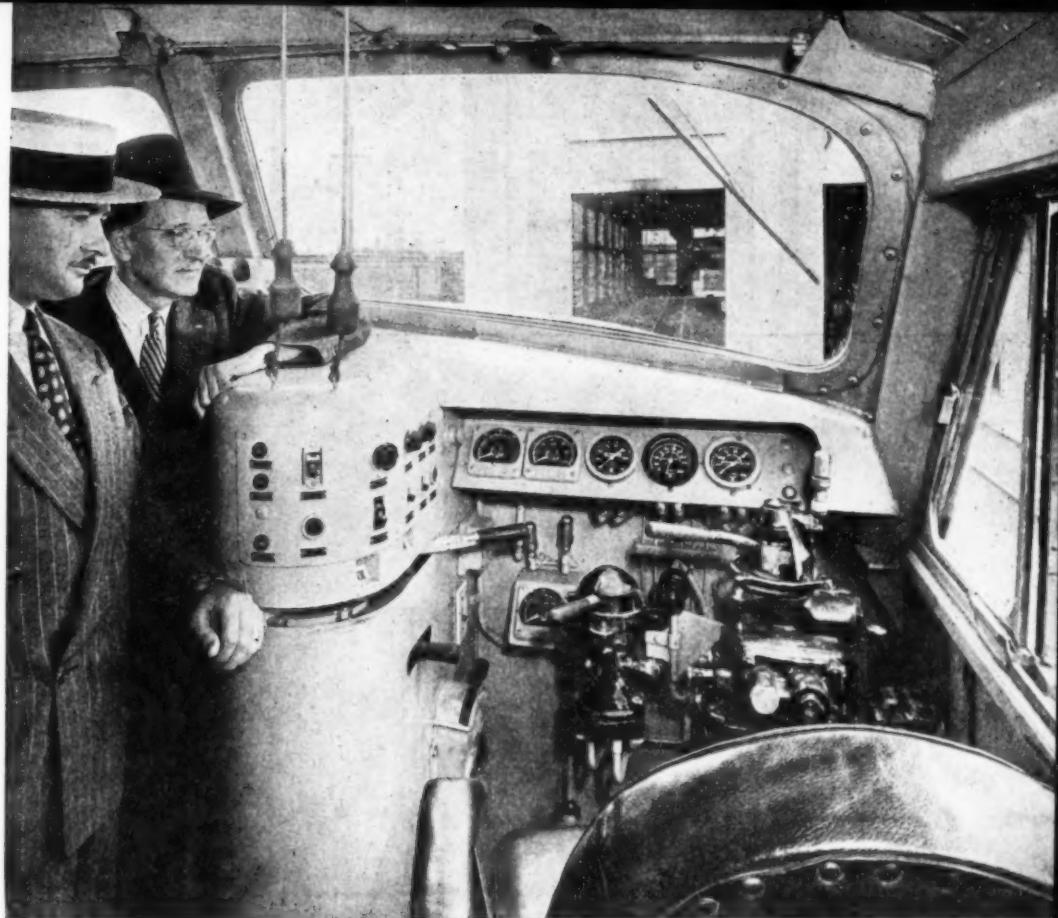


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The original welded steel trucks have given way to cast steel trucks. Like the cars, tightlock couplers are used entirely, eliminating all slack action. The 2,000 hp. F.-M. Diesels with their sensitive electric governor control, start, maneuver and stop or slow down instantly, with no over-running of the engine beyond governed speeds. The pistons are being reworked to a new design, so, for the present, they are changed out automatically every 30,000 miles. CO<sub>2</sub> fire extinguishers have been semi-permanently built into each auxiliary compartment on each unit. The 2250 lb. Clarkson steam boilers usually operate in mildly hot or mildly cold weather in pairs, the third one being shut off except in weather extremes. Maximum speed is 102 miles per hour, and for heavy continuous pulling, the locomotives develop 82,300 lbs. tractive effort at 23 mph. ample for the mountain runs. From Chicago, the fast run over the "Milwaukee Speedway" to Minneapolis is made with a double-cab, 2-unit F.-M. Diesel used in the pool of Diesels between Chicago-Milwaukee-Minneapolis-Kansas City-Omaha. At Minneapolis the big 6,000 hp. jobs are cut in. Fuel and boiler water stops are made at Aberdeen, S. D., Miles City, Mont., Deer Lodge, Mont., Othello, Wash. and the entire heavy maintenance program is done at the unique Milwaukee shops in Tacoma, where steam, electric and Diesel locomotives are all rebuilt and serviced in one compact shop. A long turnaround is given cars and engines in Tacoma, while at Minneapolis the Diesels have a 12 hour layover, and coaches an overnight layover at Chicago. Fuel, sand, lube, oil and water are likewise available in emergencies at Avery, Idaho, Harlowton, Montana, Mobridge, S. D. and Minneapolis.

The Diesels make 3500 miles in 3 days and 20 hours or about 21,000 miles per month. Each of the 6,000 hp. Diesels uses from 80 to 83,000 gallons of fuel per month per locomotive, and about 125 gallons of lube oil per unit per round trip from Tacoma to Minneapolis, or 1 gallon per hour per unit, including termi-



V. H. Cole (left), F-M Service Engineer and E. G. Tallimage, Travelling Engineer of Milwaukee road in operator's cab of 6000 hp. F-M Diesel.

nal idling periods. Fifty gallons of lube per unit are added at Minneapolis, and 75 gallons per unit are added at Tacoma.

Heavy steam demands the year round require large extra amounts of fuel above the demands of the Diesel, possibly up to 25,000 gallons per month per locomotive in extremely cold or extremely hot weather, reducing the actual consumption for the Diesels by that amount for the monthly locomotive totals.

A regular cycle of progressive maintenance is followed at Tacoma shops, during the 29 hour layover period. In emergencies or sudden special train movements, or failure of a unit, make it possible to service the Diesels from 10 a.m. till 1 p.m. and go right back the same day they arrive in Tacoma.

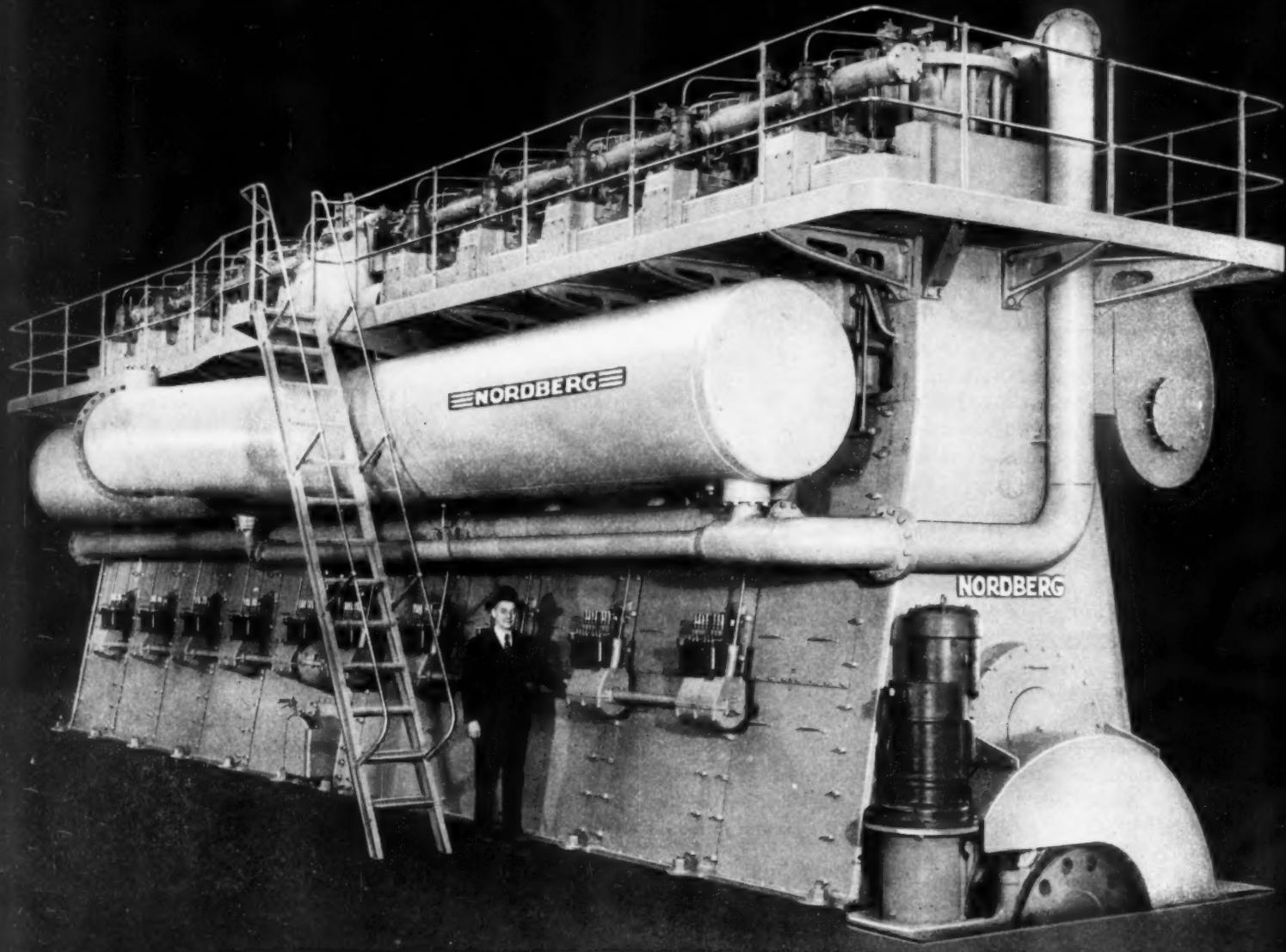
A unique economic advantage of using these Diesels in the electrified zones has already been noticeable. The periods in which the Dieselized Olympian Hiawathas operate, often coincide with heavy drag freight movements. Substitution of Diesel for electric power has reduced the possible daily maximum demand for electricity considerably, thus saving on power and saving of short time overloads on the substations.

Research is already being made into the possibility of taking a standard Diesel locomotive and substituting a D.C. motor for the Diesel, using the traction generators, auxiliaries and traction motor assembly of the regular Diesels on the Milwaukee to do the rest of the job! And, the possibility of substitution of A.C. trolley current for this changeover.

Artist's sketch of observation car of Olympian Hiawatha. It has plexiglass dome.



# MOST POWERFUL



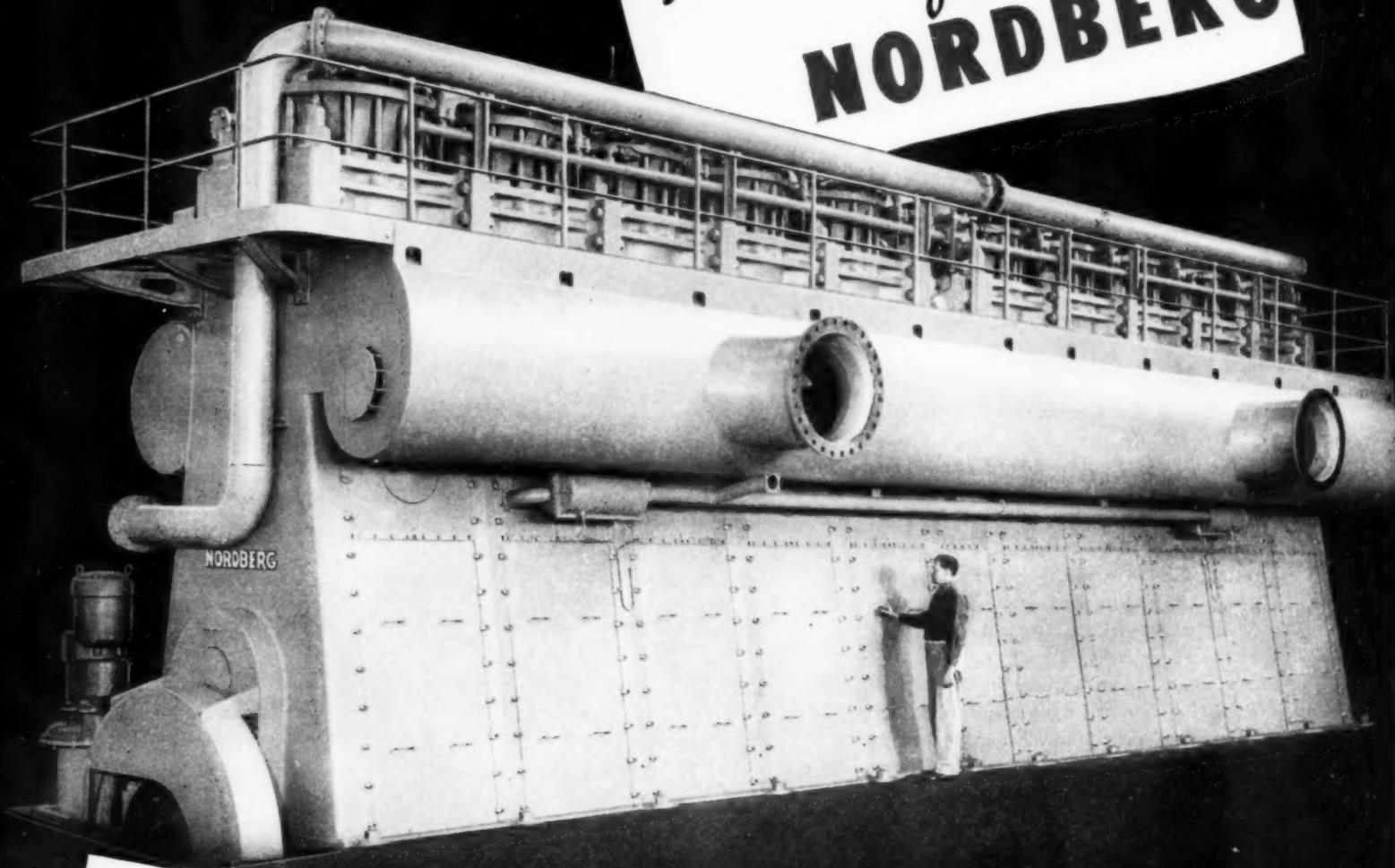
The position of leadership held by Nordberg in the large Diesel engine field is again evidenced by the building of this 7100 horsepower unit, the most powerful single acting Diesel generating set built in America. It is another achievement in the impressive

record of more than thirty-five years of Diesel engine building. Whenever there has been a demand for units of greater capacity, Nordberg has met that demand. For greater dependability and higher efficiency, a Nordberg Diesel is available for your needs.

## NORDBERG DIESEL ENGINES

# DIESEL GENERATING UNIT BUILT IN AMERICA

Another Record  
for  
**NORDBERG**



Nordberg builds an extensive line of Diesel engines in sizes to 8500 horsepower, in two and four-cycle types for burning oil or gas fuels. Whatever your requirements, whether for stationary or marine service, it will pay to investigate the merits of Nordberg Diesel engines.

**NORDBERG MFG. CO.**  
MILWAUKEE 7, WISCONSIN

#### ENGINE DATA

Horsepower (Net) . . . . .	7100 (sea level)
Generator (Net) . . . . .	5000 KW
Number of Cylinders . . . . .	10
Bore . . . . .	29 inches
Stroke . . . . .	40 inches
Speed . . . . .	164 R.P.M.

Two-Cycle, Mechanical Injection, Cross Head Construction, Motor Driven Scavenging Blower, Flywheel Type Generator.

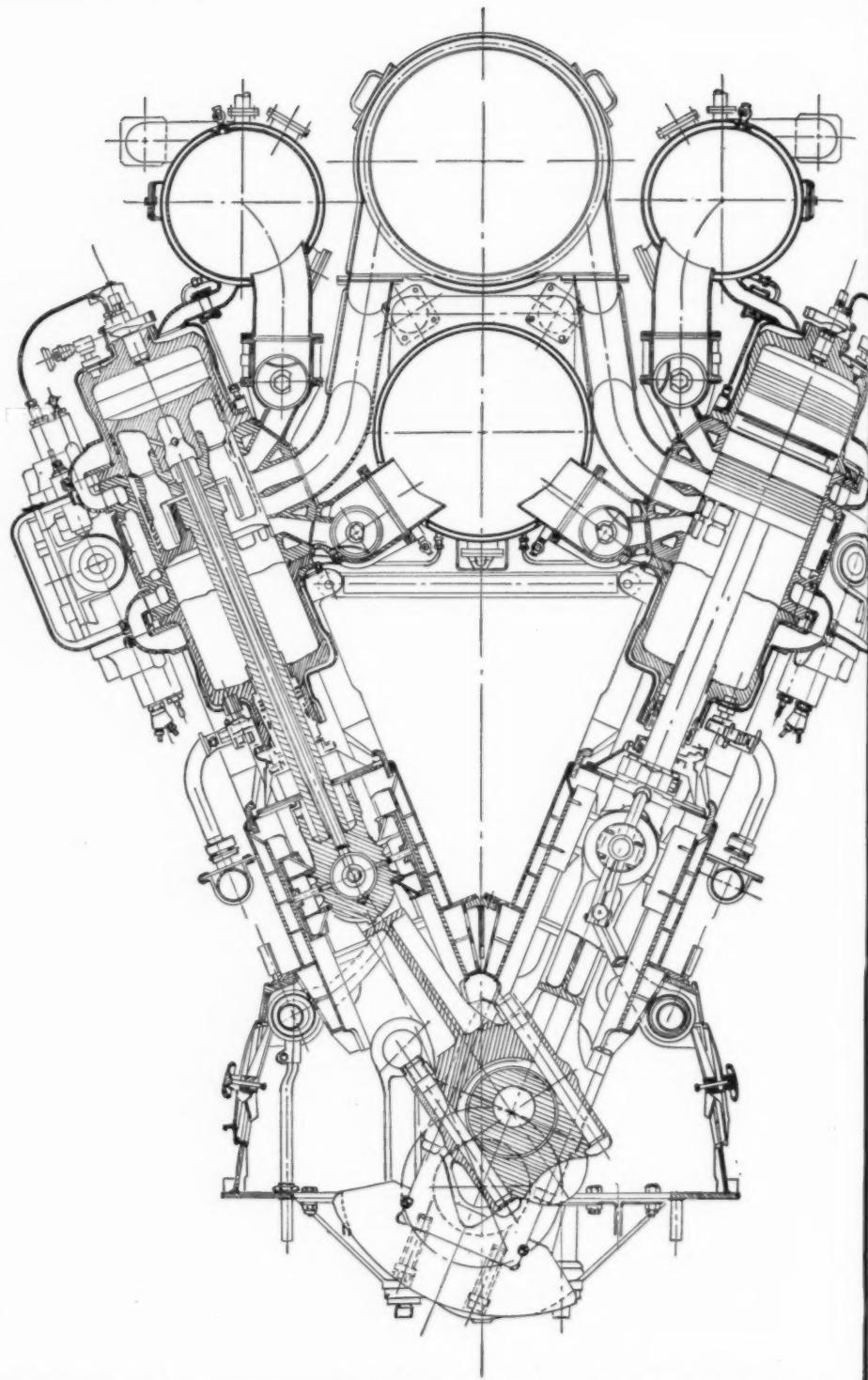
S For Stationary and Marine Service

# M. A. N. DIESEL ENGINES FOR GERMAN BATTLESHIPS AND DESTROYERS

By E. C. MAGDEBURGER  
*Bureau of Ships, Navy Dept.*

**W**HEN the German defeat became inevitable and the day of the final surrender foreseeable the U. S. Navy sent a Naval Technical Mission to Europe with headquarters in Paris. Later many outstanding German scientists and engineers were brought to this country to discuss their wartime achievements with American specialists. As the result of this activity on the part of U. S. Navy and several other government agencies an enormous amount of information has accumulated in the form of technical reports, and many samples of notable German engines and machinery were brought over for test by various Government laboratories and other research institutions. This information will eventually be disseminated to the American industry.

This brief article is to invite attention of the American Diesel industry to a design of engines intended for the propulsion of German surface warships—a battleship and a destroyer. At the time the U. S. forces occupied the M.A.N. plant in Augsburg there were on the test stands several two-cycle double acting Vee type engines of high output destined for the above purpose. Earlier in the war the decision was made to build a Diesel-propelled battleship of "O class." It was to have two wing shafts propelled by four Diesel engines each with a geared steam turbine on the center shaft. However the Augsburg plant was severely damaged by fire following the night air raid of 25/26 February 1944 when all office records and drawings were destroyed.



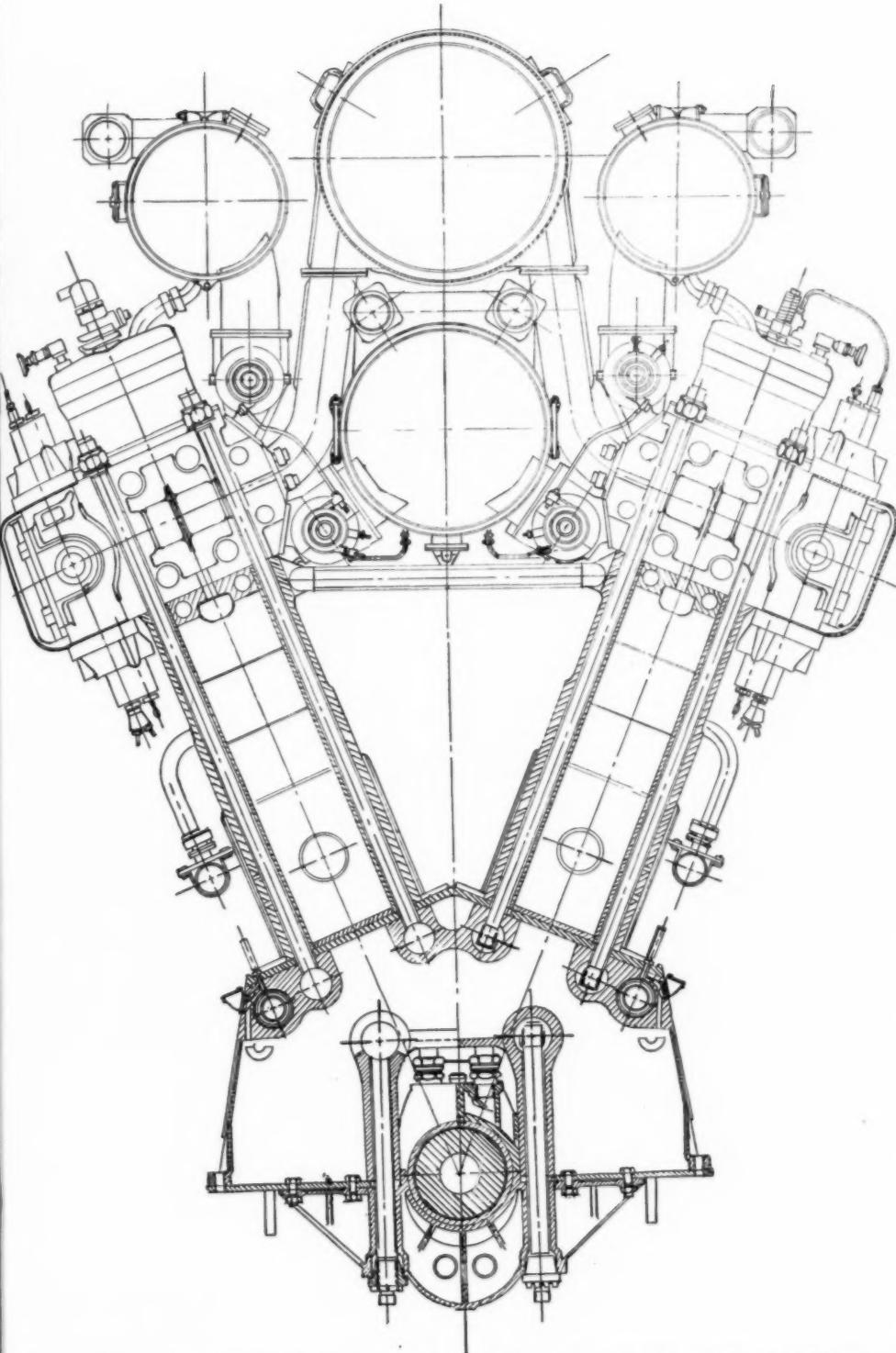
Partial section showing arrangement of cylinders, main bearing and intake and exhaust systems in the M. A. N. destroyer Diesel.

It was stated that as many as forty-eight engines were on order originally. The first engine, a V-24 with a continuous duty rating of 14,400 bhp. at 450 rpm., was built, completed 300 hours of shop tests and is still in existence, but the rest of the order was cancelled.

This battleship engine was developed from the well known engine used in the pocket battleships *Luetzow* (ex-*Deutschland*, ex-*Ersatz Preussen*), *Admiral Scheer* and *Admiral Graf Spee*. It employed a gear driven centrifugal blower used on later six cylinder engines of the same cylinder size—16.535 in. bore, 22.835 in. stroke.

The 1942 building program provided for the construction of one Diesel-driven destroyer of 1,550 tons (Z51). It was to be propelled by six 10,000 horsepower engines. Four of these engines were to drive the center shaft through

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Cross-section of the latest M. A. N. double-acting V-24 Diesel rated 10,000 bhp. at 600 rpm.

a common reduction gear and individual hydraulic clutches, similar to the drives in the pocket battleships, with each pair of engines and the reduction gear with four clutches in separate rooms. The remaining two engines were direct coupled to the wing shafts and their engine room was separated by a short auxiliary engine room from that of the after pair of main engines of the center shaft. Other auxiliaries were arranged above the reduction gear.

The main Diesel engines of the destroyer propelling plant are also of the M.A.N. two-cycle double-acting V-type with a geared centrifugal blower above the crankshaft driving flange and driving their own pumps. Of outstanding interest is the installation of an exhaust gas driven turbo-blower in the superstructure above the main deck (one for each engine) which discharges into the engine driven blower and thereby provides a two-stage system of compres-

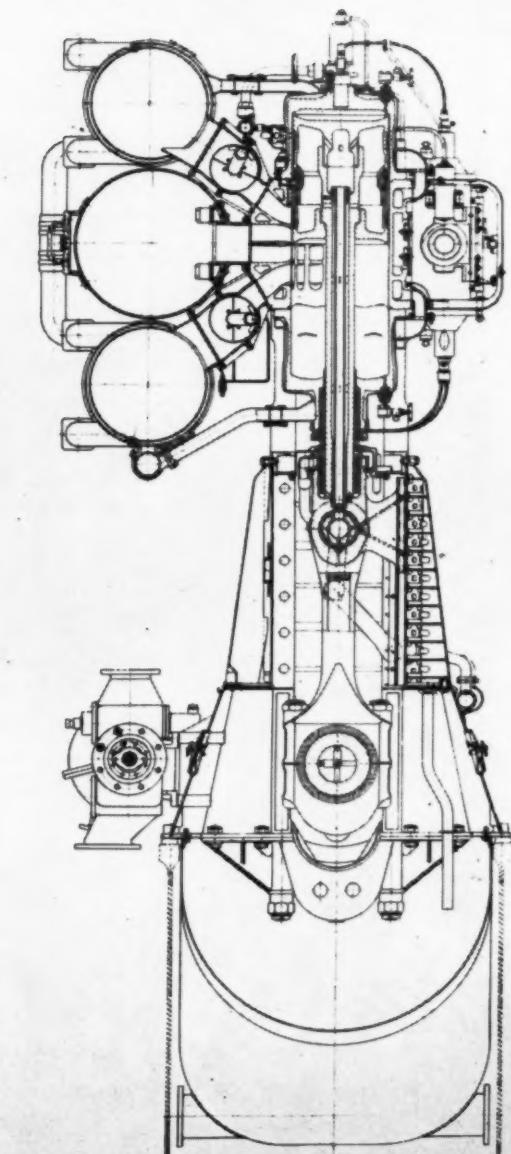
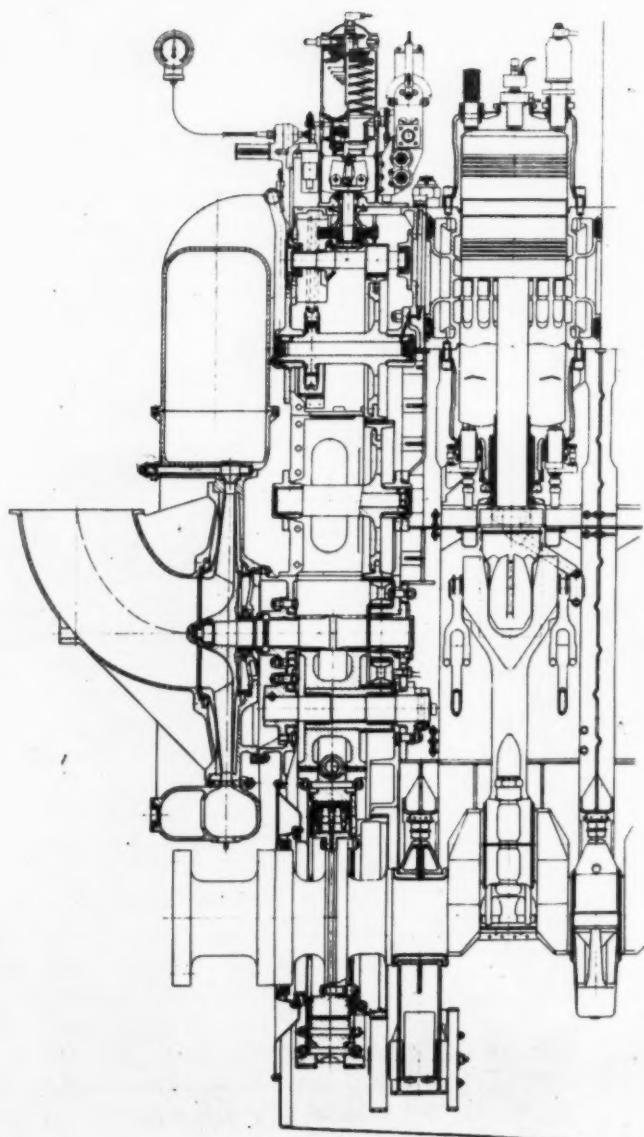
sion (without intercooling however) for the charging air. At slow ship speeds, when temperatures of exhaust gases are low, most of the compression would be done by the geared blower, while at higher speeds and higher exhaust temperatures the geared blowers would be relieved of all work of compression with consequent improvement in fuel consumption and increase in horsepower available for propulsion.

Of particular importance is the fact that such a two-stage compression system for scavenging air is immediately applicable to all existing two-cycle engines by merely substituting a divided exhaust manifold and adding a turbo-charger of appropriate size ahead of the existing engine driven scavenging blower.

Three of these main propulsion engines for a destroyer had successfully completed their shop tests and were waiting shipping instructions, a fourth stood partially assembled, while parts for the remaining two were being manufactured through the shops. These engines are of a smaller cylinder size (32/44) or 12.598 in. bore and 17.3238 in. stroke, rated 10,000 bhp. at 600 rpm. and weigh 67 tons or 14½ pounds per horsepower.

The construction of these engines embodies a number of interesting features. The crankshaft is made of two six-crank parts coupled in a crankweb. The crankcase is of welded construction with tie rods holding down the two cylinder supports which are also held together by struts at their top flange. The crankshaft is supported by cast steel bearing girders held by long bolts to the crankcase. The ship's foundation girders form the oil pan or sump. All crosshead guides are alike and easily removable. Fork and blade connecting rods are used with removable crankpin bearing upper half-shell and the lower blade end cap serving as bearing for the caps of the forked rod.

Most of the details of cylinder construction are of the same design as those used in pocket battleship engines. The inside of the cylinder is chrome-plated. A central exhaust header was used for lower cylinders of both banks, while each row of the upper cylinders had its own exhaust manifold. All three exhaust manifolds are water cooled and subdivided. The centrifugal blower of the engine is geared to the driving end of the crankshaft and a torsional vibration damper, consisting of a flywheel driven through split-sleeve spring assemblies, is on the free end. An abstract of the report of type test, next page, gives the most important data obtained during these tests.



Longitudinal, (left) and transverse, (right) sections showing further details of latest M. A. N. double-acting Diesels.

ABSTRACT OF REPORT OF TYPE TEST OF MAN 2<sup>4</sup> CYLINDERS  
TWO-CYCLE DOUBLE-ACTING DIESEL ENGINE, MODEL V12232/14, RATED 10,000 BHP AT 600 RPM

Dates of test 8-12 Feb. 1944\*\*  
Average values of the most important data obtained

Load	<u>AHEAD</u>			<u>ASTERN</u>			<u>OVERLOAD **</u>		
	1/4 Power	1/2 or Cruising	3/4 Power	Rated Power	Rated Power	Maximum Power	110%	120%	125%
(No. of engines operating (1 engine)	(2 engines)		6	6	6	6	6	6	6
Length of test - hours	1-1/4	2-1/2	1-1/2	72	1	1/2	2	1	1/4
RPM	225	326	542	600	399	500	600	600	600
BHP	923*	3,460	7,510	10,000	3,990	5,000	11,000	12,000	12,500
BMWP - psi	15.1	41.5	54.4	65.6	39.2	39.2	72.0	78.5	81.7
Torque in percent rated	24.5	63.5	83.0	100	60.0	60.0	110	120	125
Throttle position	3.2	5.4	7.05	8.4	5.3	5.5	8.0	8.9	9.0
Fuel consumption lbs/BHP/hr	.556	.417	.416	.418	.430	.453	.418	.419	.422
Exhaust temp. - upper left in manifold - °F " right	241	406	527	633	531	592	680	734	752
- lower	165	324	484	610	428	509	684	734	752
Peak pressure- upper cyl. p.s.i. - lower "	582	768	945	966	713	682	973	973	960
Exhaust at all loads only slightly visible							Slightly Visible	Moderately Visible	Visible
Lubricating oil consumption at rated power -- .00242 lbs/BHP/hr							Visible	Visible	-----

\* Brake would not absorb greater load at this speed.

\*\*Fuel pump plungers of larger diameter were then installed and additional tests of 10, 20 and 25% overload were run on August 2, 1944.

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By DWIGHT ROBISON

**T**HEY'RE still cutting pine in South Mississippi, though a large amount of this—instead of going into boards and timbers—is being cut into five-foot, three-inch lengths for pulp wood for the paper mills which have sprung up through the South to take advantage of the fast-growing short leaf pine which replaces the former long leaf.

Obviously, cutting timber for the pulp market is a different proposition from cutting for lumber. In the latter, today's demand plus short supply of quality wood means a profitable operation—if you can get the timber; an operation where perhaps the corners do not have to be so rigidly watched, where profit is practically sure to follow. For the paper mills, however, the operator has to watch his step. Here, his pulp logs are merely just so much raw material which have to pass through factory processing before they can emerge as paper; and in any manufacturing operation, the manufacturer proposes to buy his raw material just as cheaply as possible because he has to do so much with it before any returns can come in.

One successful pulpwood cutter and dealer is Sam Whitfield, who operates in South Mississippi and ships many a barge-load of pulp logs from his base on Pearl River, near the huge brick building in Logtown where the old Weston Lumber Company made its head-

quarters in the days when the firm was cutting long leaf yellow pine all over Hancock County. Here to the river bank the five-foot, three-inch logs are hauled by truck or brought downstream, unloaded and stacked on the river bank, waiting for the tugs and big barges to load up for the trip to the paper mill at Creole, Mississippi, near Moss Point. And this matter of loading barges, small though it seems, is of considerable importance to an operator like Whitfield, who knows he must watch every cost on the whole program if he is to come out on the profit side of the ledger. Mr. Whitfield decided it was costing him too much to load his barges.

The loading system was to drive the loaded trucks upon the barges, unload them by hand and then run the trucks off again. This sounds simple, but if you have ever seen a big truck loaded with pulp logs, piled high, the load frequently shifted off-center by the bumps of woods roads or trails, you'll appreciate that running such a load up a ramp onto a barge is not so easy as it sounds and that an upset truck could delay the game expensively.

So Mr. Whitfield thought about a derrick. Government surplus provided him with some of the parts. Other sources and ingenuity gave him the rest. The home-made derrick was completed and for power, Mr. Whitfield readily

accepted the industrial engine which was being used by different neighbors for driving pumps, sawmills and other heavy uses, a Buda Diesel. The engine is a little one, a Model 4-BD-153, but it has a 25-horsepower punch. It drives a 2-drum Domestic hoist for lifting the load on the boom, and is also equipped with a reversible Ideal hoist for swinging the load.

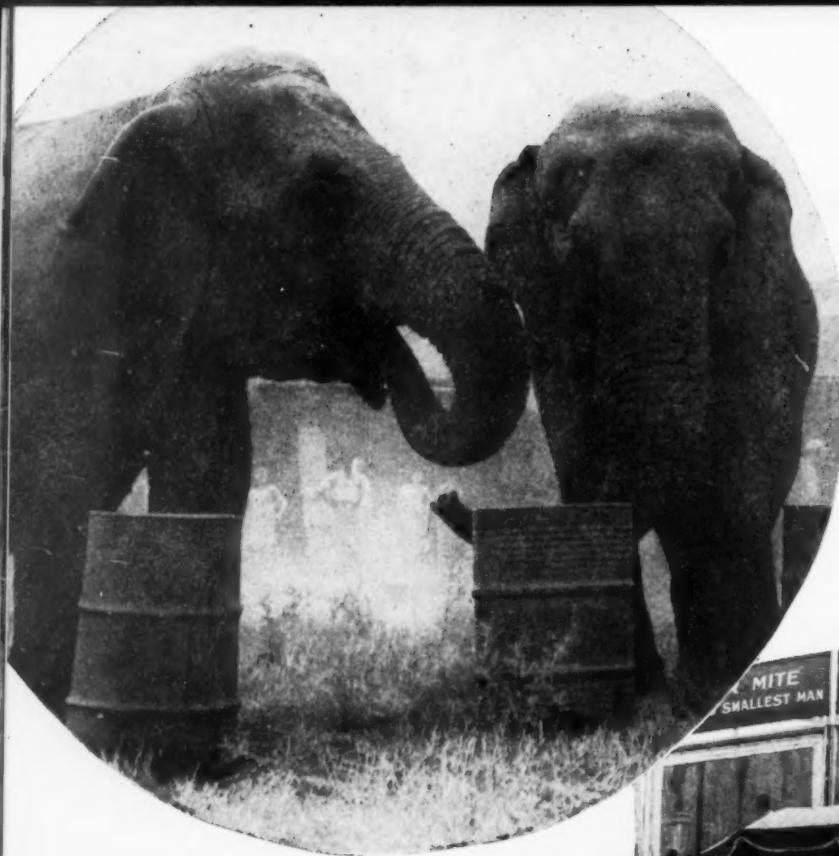
As to results, this rig will load 130 standard pulpwood units (1-1/3 cords) in about 12 hours. The former system of driving the truck onto the barge required around 30 hours for doing the same amount of work. In other words, this Buda-Diesel derrick has reduced loading costs sixty per cent—and barge loading is an important factor in the whole operation.

This loading unit has been in operation for six months at this writing, with no trouble whatever encountered and no engine repairs needed; it didn't take it long to pay for itself and to convince its designer that it was the answer to his barge-loading problems.

Mr. Whitfield has an operation at another loading point and is constructing another derrick for installation and use there; power for this second derrick will be a Buda exactly like the one in use at Logtown. Gulf Engine & Equipment Company, New Orleans, handled the sale and installation of the engine.

Pile-mounted Buda Diesel engined derrick has cut barge-loading costs 60% for Mississippi pulpwood dealer.





Can't have a circus or circus story without elephants and midway so here they are right from Ringling Bros., Barnum & Bailey—both elephants and side shows. Photos courtesy Woodward Governor Company.

## PUTTING THE "GLIT" IN (Carnival) GLITTER

By DOUGLAS SHEARING



CIRCUS and Carnival move to Main Street and neighborhood corner. Alarm clocks arouse kids, young and old, in the small hours. They hurry down in the dark to see the impossible—a complete show with all its trappings emerge as a butterfly from cocoon. Sometimes the sun, but more often a grey dawn, reveals utter confusion and in their eagerness to see all, but to avoid being stepped on, the early birds fall over snakelike lines that mysteriously thread the lot. Power lines of course, because light and power are among the first and last needs of mobile entertainment.

A starter whirs, a Diesel coughs as it takes its first bite of fuel, then settles to a muffled drone never to stop until long after the finale and the last tent post is loaded for the next jump. Yes the Diesel has put new life and energy—more glitter in outdoor shows and saved them millions in the aggregate.

Down in Memphis, Tennessee, the Lewis-Diesel

Engine Co. quietly but surely makes a business of powering carnivals and circuses—big business that is—something like a million and a half worth in the last few years—mostly on credit. E. Womble, vice-president of the Lewis-Diesel Engine Company, distributors of General Motors 71 Series Diesels, points with pride to the integrity of showmen. He says they frequently phone 40 or 50 thousand dollar orders for power equipment without a scratch of a pen to secure the deal, but his company has never lost a penny nor spent a penny in litigation or collections.

Yes, the powering of mobile shows is a big business, surprising in its ramifications. One thing is the power wagon with its Diesels, generators, distribution panel, coolers, governors, filters—in fact a complete self-sufficient central power station on wheels. Another thing is the business of safely and dependably piping power to midway, big top, cook tent, living quarters and a hundred other services vital to the enter-

prise. Lines not only have to be laid down fast but they must also be taken up and stowed in a jiffy. This was old stuff to Mines Equipment Company after years of experience in developing cable connectors and all sorts of electrical fittings for mine lighting, oil drilling operations, construction jobs and a myriad of jobs where "tough" connectors are a must.

So here was a natural. The Lewis-Diesel Engine Company with a power plant made-to-order for the outdoor show, also with a following among showmen all over the country, and Mines Equipment Company with cable connectors that would withstand kicking around and any kind of weather. So they worked together to produce a safe and sane cable wiring harness that really put the "Gilt" in (Carnival) glitter. They say it is real fun to do business with showmen and apparently the feeling is mutual since ninety per cent of the power equipment used by outdoor shows in the United States is supplied by these companies.

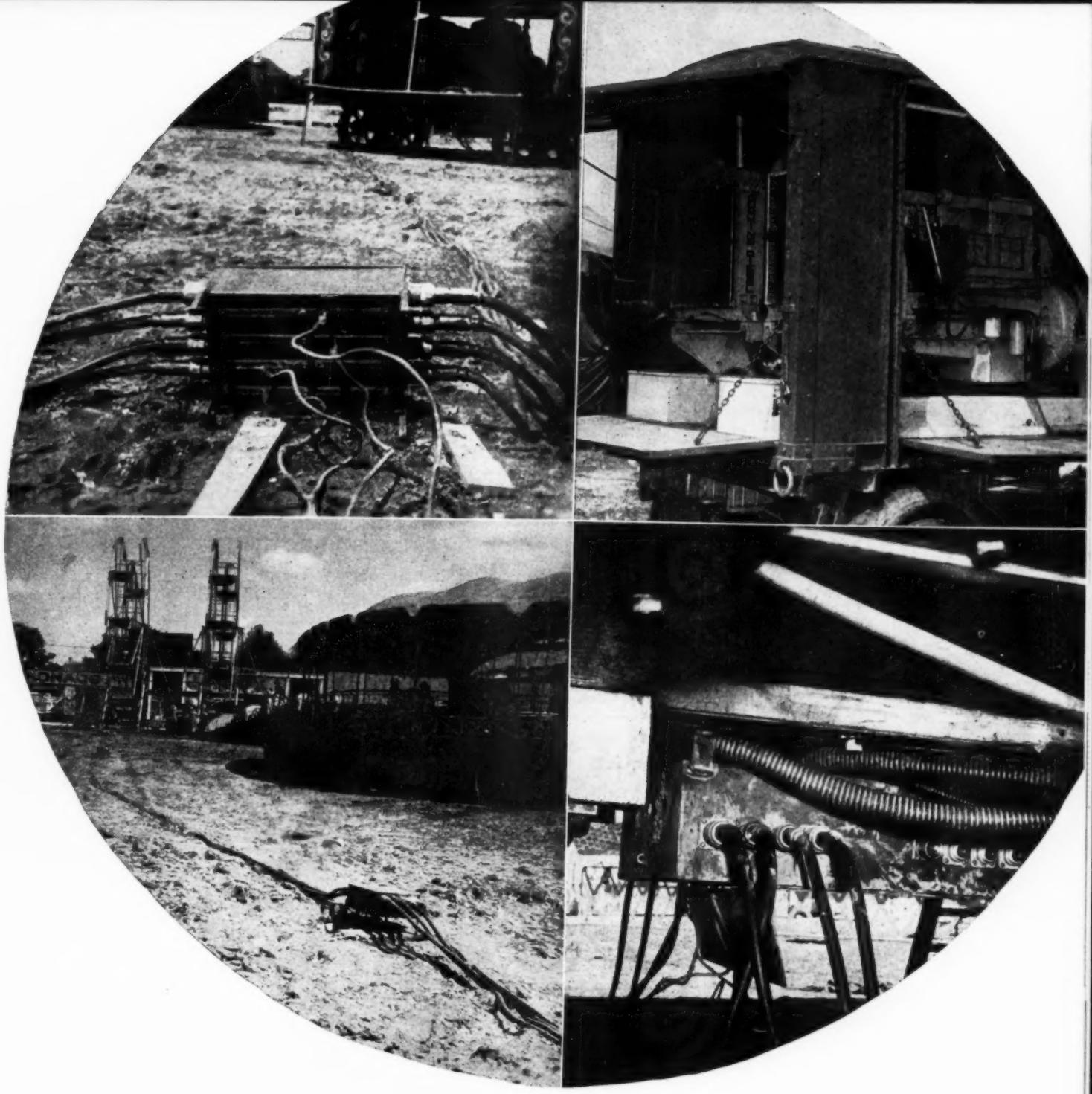
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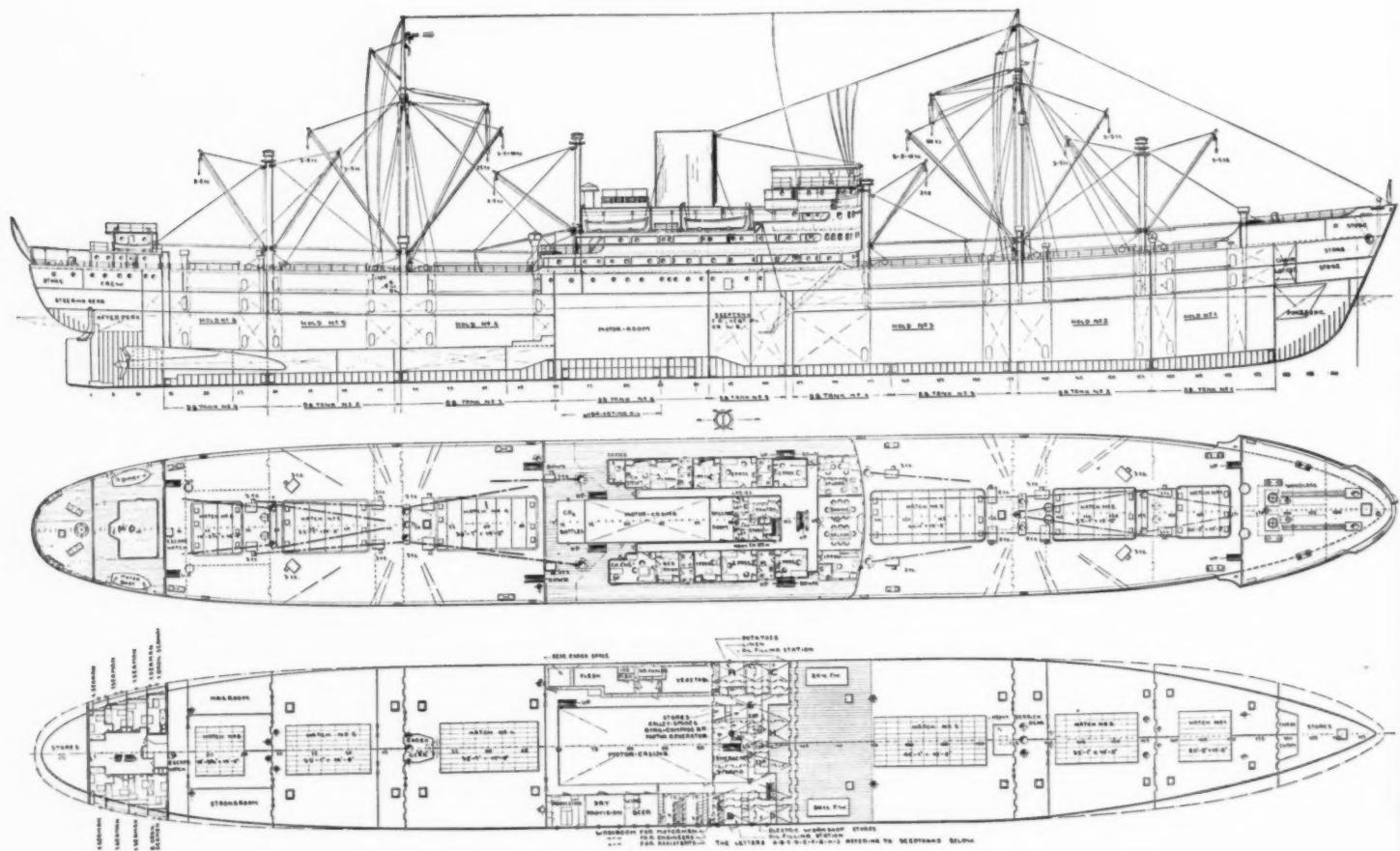


Clockwise starting with upper right quadrant:  
typical carnival power wagon with Cummins Diesel.  
Next three views show cable connections leading from power wagon; junction box on the field and distributing box with lead-off cables to various services. Photos courtesy Lewis-Diesel Engine Company, G. M. distributors, and Mines Equipment Company.



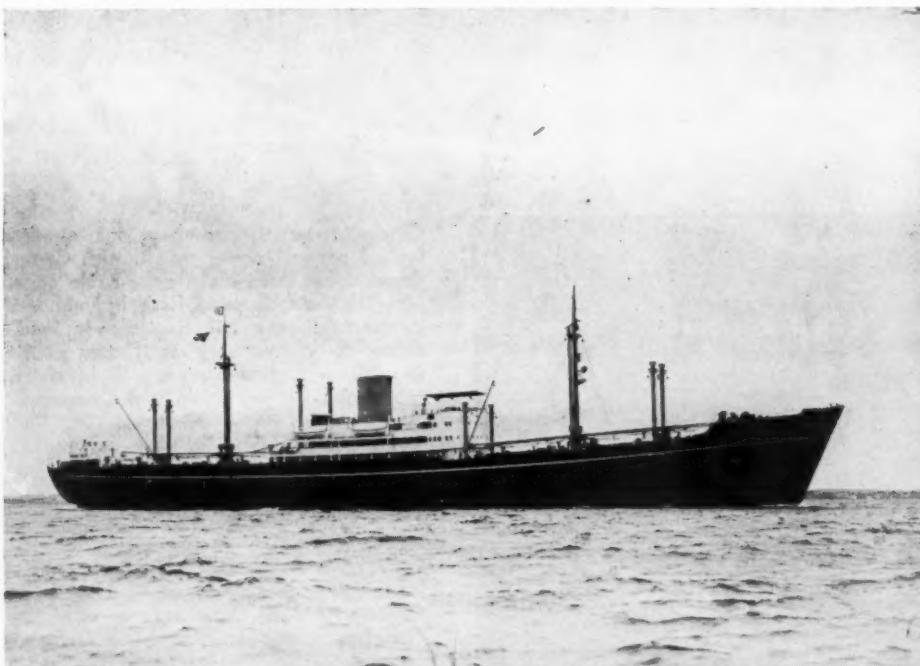
Left, Edward "Whitey" Versteeg, engineer for Ringling Bros., seen at his No. 1 power wagon with G. M. Diesel in foreground. Photo courtesy Woodward Governor Company.

# DIESEL SHIP KAMBODIA



Top to bottom; Outboard elevation, promenade deck and upper deck plans East Asiatic Diesel ship "Kambodia."

Here the "Kambodia" is seen on trial trip. Her main power is two Burmeister & Wain, 10-cylinder Diesels of 13,900 IHP normal output.



**T**HE Diesel ship *Kambodia* was originally ordered by a German shipowner as a cargo ship with accommodation for 12 passengers. The vessel was launched in 1943 and was then laid up in the port of Copenhagen. After the war, the Danish State sold her to the East Asiatic Company and she was renamed *Kambodia*. She has now been completed and incorporated in the fleet of the company as a compensation for vessels in the allied service which were lost during the war.

The principal dimensions are as follows:

Length overall .....	164.9 m.
Length between perpendiculars .....	152. m.
Beam .....	19.5 m.
Depth to upper deck .....	12.5 m.
Draught .....	9.23 m.
Dead-weight .....	12400 ts. of 1016 kos.
Speed .....	17 knots

The *Kambodia* has 3 decks, 8 water-tight bulkheads, double bottom from forepeak bulkhead to after peak bulkhead for fuel oil, lubricating

oil, water with a 1 engine room, water ballast tunnels and water tanks is: tons, wood and fresh

The rigging posts with 10-ton deck one 50-ton 25-ton deck fourteen 3 A 5-ton Under the fitted, each horizontal member which theing effect

The acciaio specifically for passengers and 4 two and bath dining saloon and dining doors, who communicate each 16 se

The account engineers, is amidships aft. All the crew's the front upper deck spacious ventilation cabin, wireless and charter navigating

The *Kambodia* fire extinguishers, the navigation electric-hydraulic gyrocompass, electrosynthetic view screen

On the trials of 18 knot

The main direct reverberation

oil, water ballast and fresh water, 6 holds each with a hatchway, and deeptanks forward of engine room for fuel oil, vegetable oil and water ballast. At the sides and between the tunnels there are tanks for fuel oil, wood oil and water ballast. The total capacity of the tanks is: fuel oil 2262 tons, vegetable oil 832 tons, wood oil 145 tons, water ballast 3953 tons and fresh water 258 tons.

The rigging consists of 2 masts and 8 derrick posts with two 3-ton, fourteen 5-ton and four 10-ton derricks. Furthermore, on the forecastle one 50-ton derrick and on the mainmast one 25-ton derrick. The derricks are served by fourteen 3-ton, two 5-ton and two 8-ton winches. A 5-ton warping capstan has been fitted aft. Under the forecastle 2 windlasses have been fitted, each having a vertical shaft with horizontal messenger wheel and warping drum, by which the anchors can be lifted and the warping effected independently of each other.

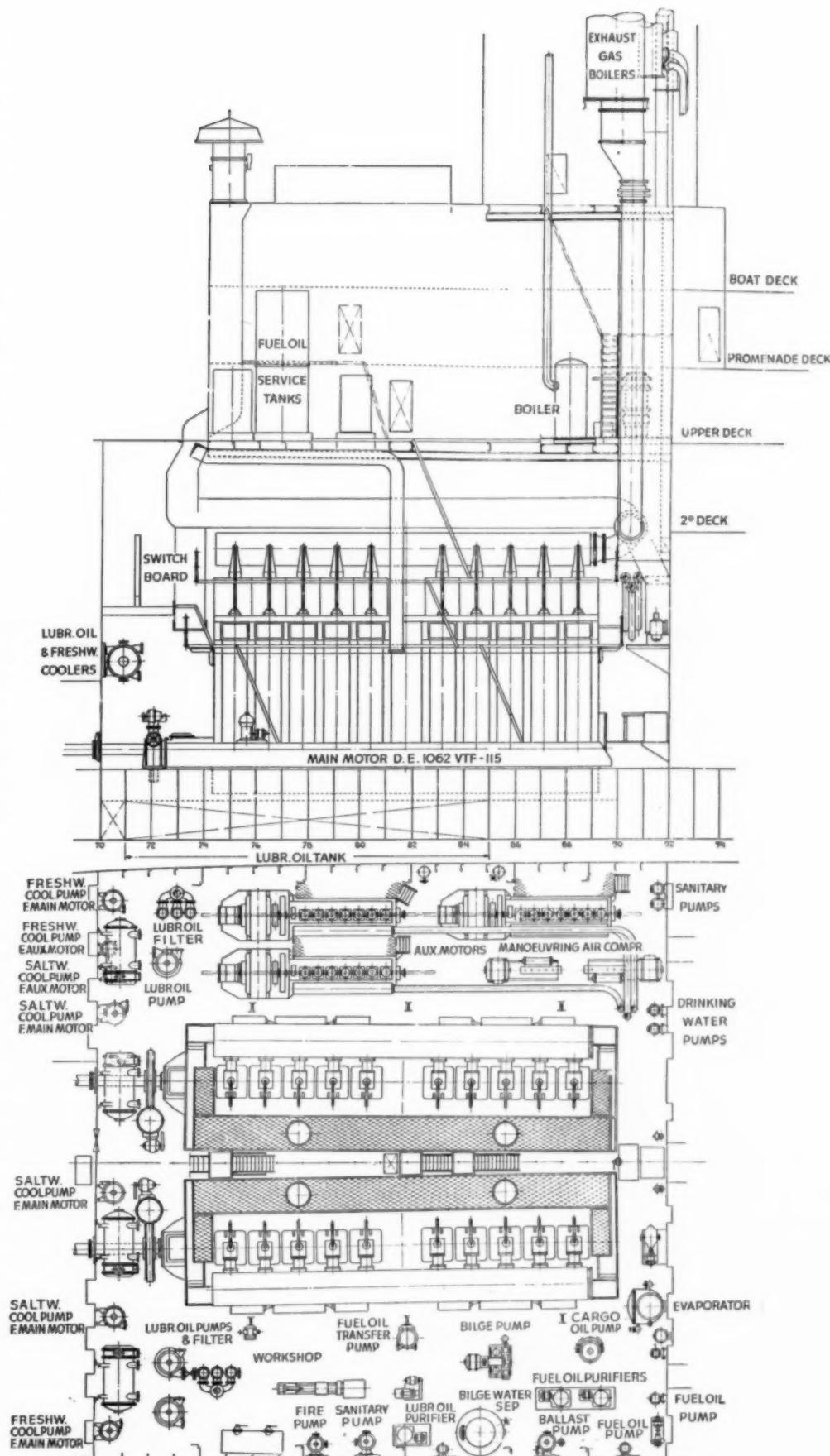
The accommodation has been executed especially for the East Asiatic Company and for 12 passengers. It comprises 4 single-berth cabins and 4 two-berth cabins, all with separate toilets and bathrooms and with smoking room and dining saloon adjoining. The smoking rooms and dining saloons are separated by sliding doors, whereby the saloons can be made to communicate with each other. The saloons have each 16 seats.

The accommodation for the Master, officers, engineers, steward, galley staff and motor men, is amidships, whereas the crew's accommodation is aft. All the messrooms, both the officers' and the crew's messrooms, have been arranged in the front of the deckhouse amidships on the upper deck. All the rooms are very large and spacious with good lighting and mechanical ventilation as well as electric heating. Master's cabin, wireless operator's cabin, wireless room and chartroom are situated in the house on the navigating bridge.

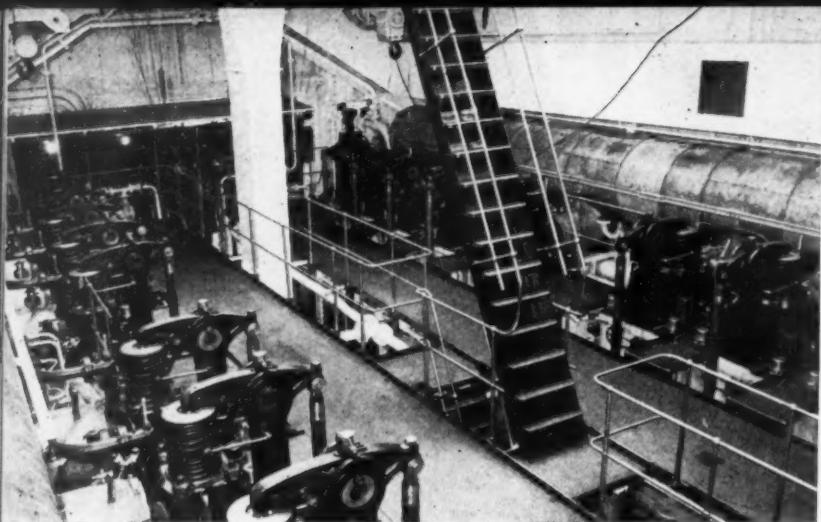
The *Kambodia* has been equipped with CO<sub>2</sub> fire extinguishing appliances with detector on the navigating bridge; steering gear for the electric-hydraulic steering engine, compasses, gyrocompasses, log, radar, echo sounding apparatus, electric engine-room telegraphs and clear-view screen.

On the trial trip the vessel attained a speed of 18 knots.

The main engines are two Burmeister & Wain direct reversible, single-acting, 2-stroke, 10-cylinder



Top view: longitudinal section of engine casing and engine room, below which is shown the plan of machinery space.



Upper engine grating showing tops of the two B & W main engines.

der crosshead engines with airless injection, cylinder diameter 620 mm., stroke 1150 mm., total normal output 13900 ihp., corresponding to 11200 bhp., at 140 revolutions per minute; on a 6 hours' trial trip 15500 ihp., corresponding to 12500 bhp., at 145 revolutions per minute.

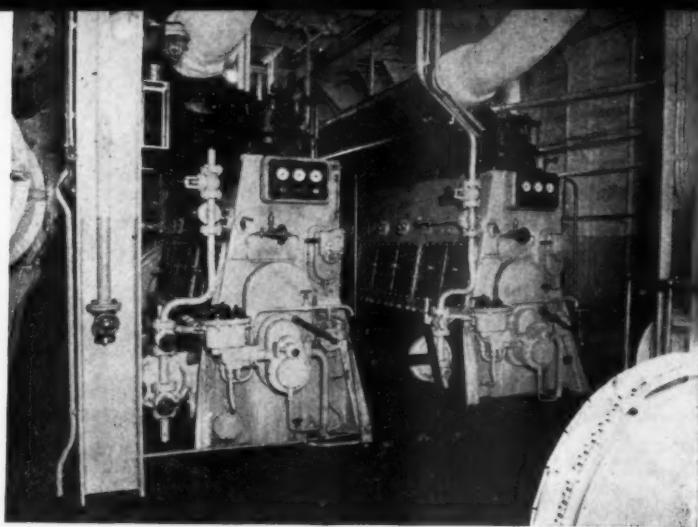
In accordance with B&W practice the rotating scavenging air pumps are fitted on the rear side of the engine which arrangement gives the shortest possible engine. The engine is built with short pistons and cylinder liners giving the least possible height of the engine and retaining the pure crosshead principle that cylinders and crankcase should be kept apart.

Auxiliary engines aboard the *Kambodia* are three single-acting, 4-stroke, 7-cylinder trunk piston engines with airless injection, each direct coupled to a three-phase AC generator of 250 kw., 400/231 volts. The Diesel cylinders have a diameter of 245 mm., a stroke of 400 mm. and an output of 375 bhp. per engine at 500 revolutions per minute. Further a three-phase AC generator of 450 kw. is driven at 130 revolutions per minute off the main engine, from the foremost starboard intermediate shaft through a wheel gearing with incorporated resilient coupling. The generator is provided with a speed regulator for the tension. It cannot be connected in parallel with the auxiliary

engines, but when the ship is at sea, pumps, etc., have to be coupled from the bars of the auxiliary engines onto those of the shaft generator.

All large pumps are vertical centrifugal pumps running abt. 1450 revolutions per minute, direct coupled to three-phase AC motors with short-circuit start. By changing the pole connections the revolutions of the lubricating oil pumps can furthermore be reduced to 950 per minute. The two main engines have separate cooling oil and cooling water systems, each system being fed by individual pumps, but having common stand-by pumps. There are 3 lubricating oil pumps, each having a capacity of 240 cu.m. per hour at a pressure of 3.5 at, further 3 sea-water cooling pumps, each having a capacity of 230 cu.m. per hour at a pressure of 2.1 at, and 2-fresh-water cooling pumps, each having a capacity of 230 cu.m. per hour at a pressure of 2.1 at. The auxiliary engines have a common sea-water cooling pump of 40 cu.m. per minute and a fresh-water pump, also of 40 cu.m. per minute, to be used in port. The lubricating oil is drawn from the bottom tanks beneath the two engines; it is discharged through the respective filters and lubricating oil coolers to the two main engines, where it is used partly for cooling of pistons, partly for lubrication of bearings, whereupon it flows back to the bottom tanks. For each main engine

Seen here are the two B & W, 7-cyl. 250 kw. auxiliary generating units.



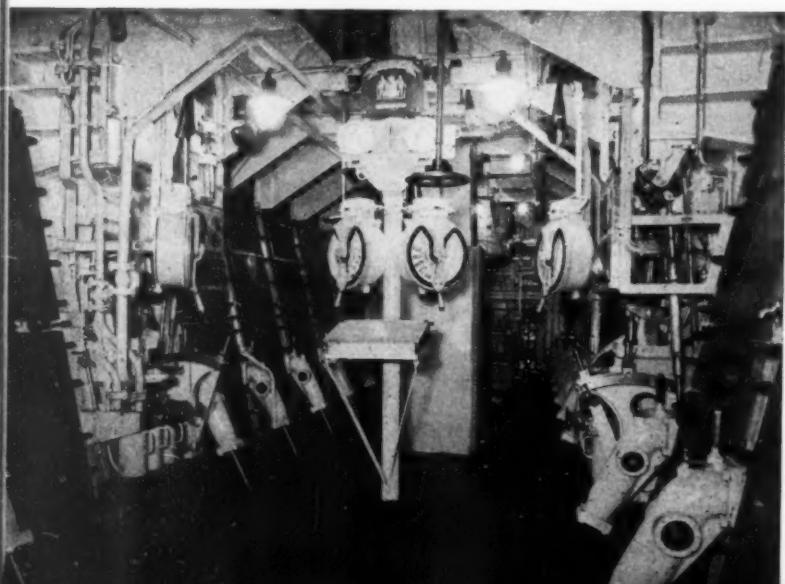
there are two 140 sq.m. oil coolers connected in parallel so that one may be cleaned while the other is in use. The coolers are made of steel plate and have cast iron covers, tube plates of brass and tubes of yellow metal. The Diesel engines are fresh-water cooled, and each engine has a 200 sq.m. fresh-water cooler of the same type as the oil coolers. The fresh water pumps draw from the main engine and discharge through the fresh-water cooler back to the main engine. The system is closed, and in the casing an expansion tank of about 1 cu.m. is fitted. The sea-water cooling pumps draw from the sea and discharge through oil cooler to fresh-water cooler and over board.

Starting air for the Diesel engines is supplied by two 2-stage maneuvering air compressors, each of 5 cu.m. intake air per minute at 1000 revolutions per minute, direct driven from electric motors. There are two starting air receivers, each having a capacity of 18 cu.m. at a pressure of 25 at.

The shafting is provided with roller bearings, for which reason every second coupling on the shaftings is a muff coupling so as to enable fitting of the bearings. The stern tube is of cast iron with linings of white metal and provided with stuffing boxes. The propeller hub is of cast iron with 3 loose blades of chromium steel.

Maneuvering platform in the engine room.

Officers smoking room on the "Kambodia."



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# MODEL DIESEL DISTRIBUTORSHIP IN OHIO

The modern plant at Steubenville, Ohio, which houses the R. C. Call Company—distributorship for Detroit Diesel Engine Division Marine and Industrial Diesels.



THE R. C. Call Company of Steubenville, Ohio, Marine and Industrial Distributors for General Motors Diesel engines, were hosts recently to some 600 visitors who attended a three-day "open house" celebrating the completion of the company's new sales and service plant. Within this 90 by 50-foot brick and steel structure which was erected at a cost of \$90,000 is a model Diesel engine distributorship in every sense of the word. The building and equipment layout represents many months of careful planning by Mr. Call along with Detroit Diesel Engine Division experts and no expense has been spared in putting together a flexible, smooth-running establishment that is unsurpassed from the standpoint of efficiency and attractiveness.

The center of the building juts out from the main structure forming a 30 x 30 foot show room, affording visibility through large plate glass windows from three sides. Occupying the right front wing of the building is a factory-designed parts stock room set up to conform exactly with the Detroit Diesel Balanced Parts Stock Plan. This department covers an area of 600 square feet and can easily accommodate up to 2,000 different items without crowding.

The overhauling and repair operations are performed on two levels at the rear of the building with each having its separate servicing functions. Following a patterned flow, engines coming into the shop for overhaul will be admitted on the lower level where disassembly work is performed. Parts from the disassembled units are placed on carts especially designed to accommodate sub-assemblies and major components of the General Motors Diesel engine. After cleaning in a degreasing vat the cart containing

all of the original engine parts move up to the main level for inspection by the shop foreman. At this point parts needing replacement are requisitioned from the stock room and specific instructions issued for repair procedure. Six groups of benches have been provided in the main floor shop for inspection and repair of various sub-assemblies; each being equipped with tools for the performance of a particular job. Adjacent to the sub-assembly work benches is a large engine re-assembly area where four General Motors Diesel engines can be worked on simultaneously. Called for in the final plans but not yet completed are a dynamometer room, paint spray booth and overhead cranes.

Mr. Call himself is a pioneer in the distribution of General Motors Diesels, having been engaged in this work since the engines were

first manufactured in 1937. In fact he holds the distinction of having delivered the first Series 71 production unit in this country. Up until 1943 he sold the General Motors line under a dealership contract, and since the war has been operating on a distributorship basis.

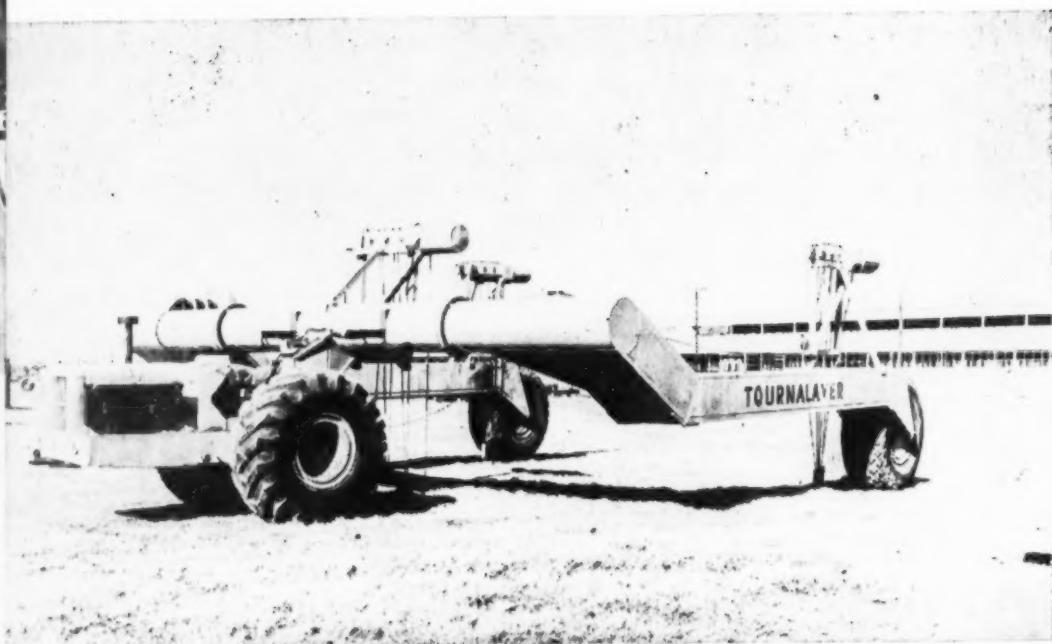
Starting with a small shop in the basement of his home, where the first overhaul job was performed, the business has gone through a gradual but steady expansion culminating in this well fashioned enterprise. The present organization consists of ten people, including Mr. Call's wife and son, Everett, but it is expected that the staff will be increased to a total of 25 when operations are fully under way.

The company also maintains sales and service outlets in Charleston and Clarksburgh, W. Va.

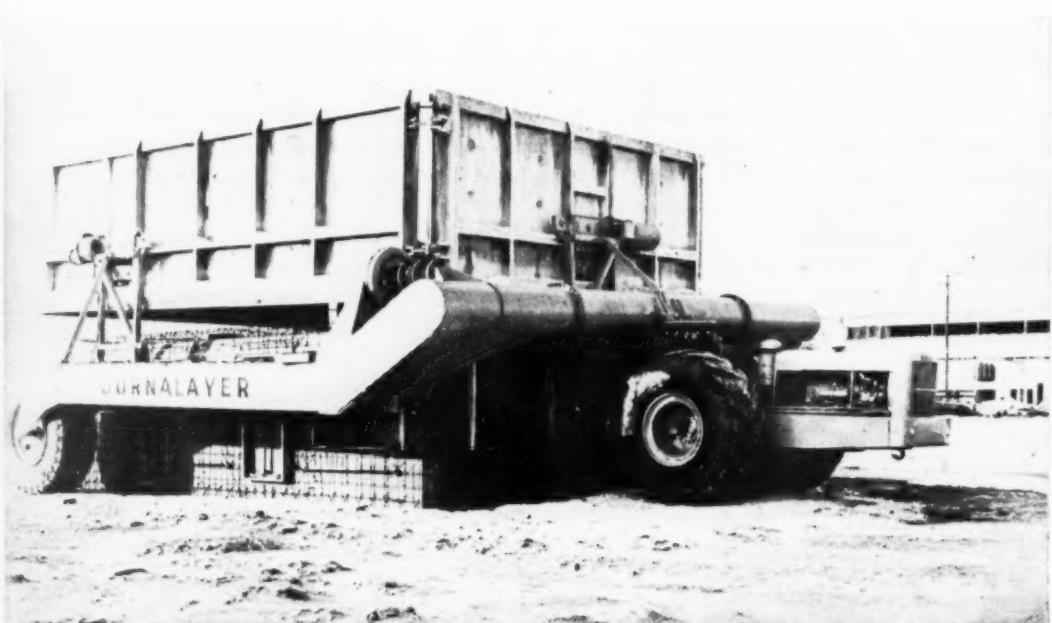
View of repair shop in the R. C. Call plant showing modern equipment and pleasant working conditions.



# AMAZING DIESEL HOUSE-BUILDING



The Tournapull—Diesel-engined, and trailer, shown here, comprise the Tournalayer which can service up to ten sets of forms.



The Tournalayer in position to lower the outer form, hoisted high, down over the inner form.

Concrete mixer mounted on Tournapull in position to pour. This unit pours walls, partition and roofs before moving on to next forms.



A MACHINE that will build complete homes seems something a little out of the ordinary. But to R. G. LeTourneau, the development of such a machine was a natural outgrowth of his penchant for heavy machinery and his earnest desire to speed the construction of low cost housing in a time of shortage.

LeTourneau became interested in housing as early as 1935 when employees of his Peoria, Illinois plant had difficulty in finding suitable homes. Through the years he has built houses for his workers in Illinois, Mississippi, and Georgia of welded steel, concrete blocks, and monolithic concrete in several designs. The new machine is the result of those years of experimentation.

The Tournalayer is a mammoth mobile machine comprised of a specially designed two wheeled Diesel prime mover coupled to a huge "U" shaped trailer on which is detachably mounted the immense outer hollow steel form of the basic four room structure. In addition to the outer form, a base and two inner forms comprise one complete set of forms necessary to build this basic structure of the house.

The two inner steel forms, secured to the base, shape the inside of the walls and ceilings. A five-inch space between the two inner forms provides a five-inch partition the full length of the structure. The outer box-like form, open top and bottom, when lowered over the inner forms, leaves a five-inch space between to form the outside walls. This space flares out at the bottom to twelve inches for foundation and bearing area. Thus the conventional separate grade beam becomes an integral part of the basic structure.

The outer form also shapes the outer surface of the house and eaves. When the concrete has set, and the house is ready to be transported to its permanent site, a simple mechanical device releases inside forms from the concrete.

The entire weight of the Tournalayer with concrete house suspended in outer form is estimated at approximately 215,000 pounds. The house itself will weigh in the neighborhood of 50 tons or less. Flotation for the huge Tournalayer is gained by the use of large 30 x 40, 34

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ply pneumatic tires. Each tire will measure approximately 9 feet high and 36 inches in width.

The concrete house, as initially released from the forms, measures 32 ft. 8 in. long, 24 ft. wide and 10 ft. high, and is made up of reinforced insulating type concrete. All walls are 5 in. thick, the roof being 8 in. thick at the outside sloping inwardly to 5 in. at the center for drainage. The floor plan design has unlimited possibilities and may be varied according to the ingenuity of architects and contractors.

Immediately after a house is removed from the inner forms, and while the house is being carried in the outer form to its permanent lot, the inner forms can be prepared for the next house. It is estimated that less than three hours are required to get ready to pour another house.

Prefabrication of many of the various items that go into the structure of a "Tournalaid" house will greatly speed mass production of homes. Conduits, of which approximately 180 feet will be sufficient for most units, are cut in advance and bent into shape. Window bucks of wood, steel, aluminum or "what have you" may be prepared for mass assembly against inner forms. Reinforcing steel is prefabricated and placed in position against each side and top of inner forms in sheets and securely fastened together at the corners. Even openings for windows and doors are cut in advance, according to the individual house plan. In the LeTourneau employee housing project in Longview, Texas, approximately 3000 lbs. reinforcing steel are used for the 24 ft. 0 in. x 32 ft. 8 in. units, while approximately 2000 lbs. are used in the 18 ft. 8 in. x 24 ft. 0 in. units.

LeTourneau's newly developed Tournamixer mixes and pours concrete with considerable speed and efficiency. It is a transit type mixer of 6 to 8 cubic yards capacity which will travel at speeds up to 16 mph., back up to the house forms and eject concrete right up over the top. The Tournacrane lifts 10 tons up to an elevation of 30 feet and is well suited for assembling house forms on their bases, loading and unloading Tournalayer equipment from flat cars and performing various other heavy lifting jobs.



Outer form containing the entire house is next moved to foundation. Form is expanded and hoisted away.

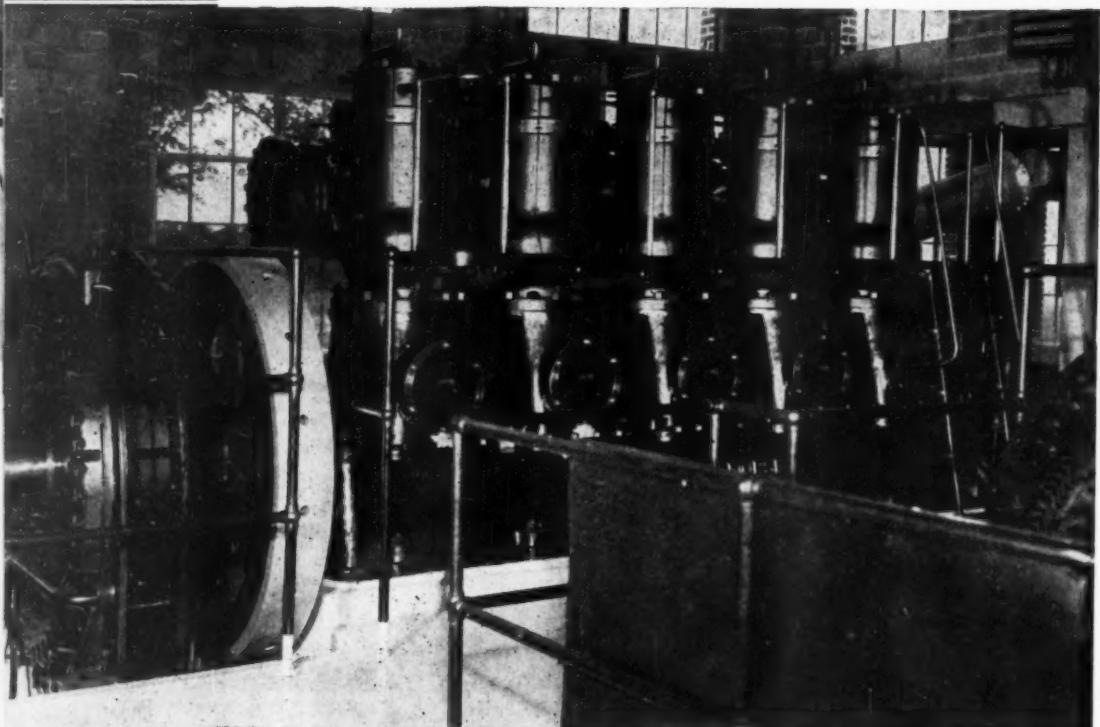


Here is the finished house. Location and size of doors and windows is optional permitting a wide variety of arrangements.

Interior view of Tournalaid home showing decorative and furnishing possibilities.

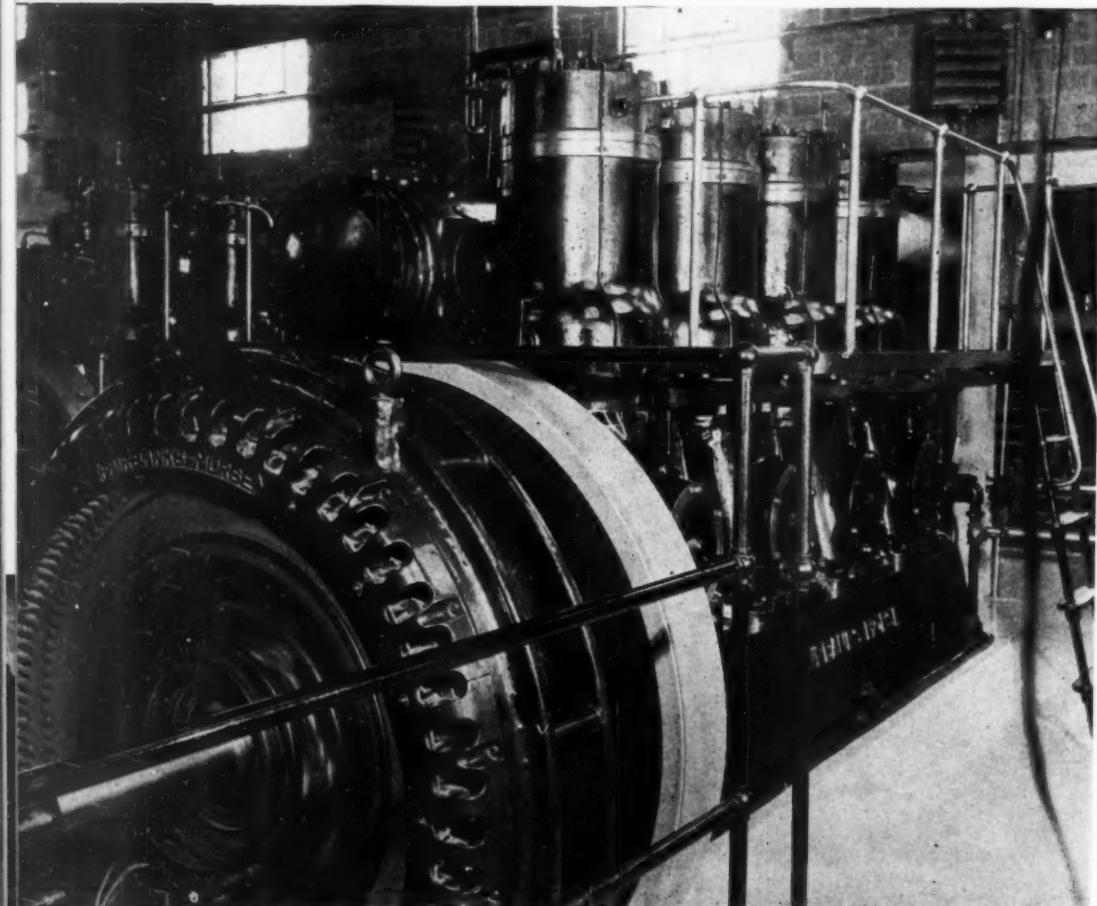


## MUNICIPAL DI



375 hp. 300 rpm. Fairbanks-Morse Diesel driving 250 kw. generator. Engine is equipped with Woodward governor. Closed cooling water system is treated with Sand Banum.

300 hp. Fairbanks-Morse Diesel at Washington, Kansas, Municipal power plant showed a maximum cylinder wear of only .009 inches after 42619 hours of operation.



**I**T took a combination of a Kansas twister that damaged the white way system, climaxed by a United States Supreme Court decision for the citizens of Washington to win their municipal light and power plant. The Kansans, always noted for their self-reliance, determined to dig in and fight for what they wanted. They were encouraged in their decision to change from a privately owned utility to a municipally owned one by surrounding communities who already had installed their own power generating equipment and knew its advantages. Four and a half years and many trials later, the Supreme Court of the United States (80 Fed 2nd 420) refused the power company's motion for retrial of the case decided at the federal district court in Topeka in favor of the city. There could be no higher appeal and at last the citizens were free to serve themselves.

Since April of 1938 the city officials and town-people who willed the plant into being have watched its expansion and witnessed returns, now approximately \$15,000.00 profit per year, greater than even its most determined advocate believed possible. A little over two months after the day the plant began operation, the entire town was serviced by the two generating units, one 150 hp. and one 300 hp. Fairbanks-Morse Diesel engines. In the spring of 1942 a 375 hp. unit, also of Fairbanks-Morse manufacture, was added and paid for out of the plant's earnings to serve the community's increased demands. The carefully kept daily log and the graphs show a complete picture of success and expansion. In 1946, there were 935,600 kws. generated and 640 meters were connected to a population of 1500. This load shows a fifty per cent increase over the year 1943, and is twenty-one per cent over 1945 which was the largest one of any calendar year. The kilowatts generated in the first four months of 1947 are fourteen per cent over previous banneryear months.

To understand the situation at Washington, about ten miles from the Nebraska line, one must understand the character of north central Kansas. The towns are small and far apart, but their importance far exceeds their population. Each one is a nucleus, and a drawing power for the prosperous wheat and cattle farms spread over the vast acreage. Washington, with a population of 1500, is the county

seat of Was around whic ing miles re back of the t natural ston grounds, the gardens, and play grounds of the plant. Creek, brook falls is not men. From

The building by the E. T. City, Mo., produces—light structed of s and ventilat areas. The g of the park one enters floor are, in hp. and the additional 3 Morse man strok, at 3 Woodward 1

Rear view o silencers (le

# AL DIESELS WORTH FIGHTING FOR

By A. V. REITER

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seat of Washington County, and is the hub around which the activities for many surrounding miles revolve. The municipal plant sets back of the town, where are gathered the sturdy natural stone buildings of the city-owned fair grounds, the ball park, the shade trees, flower gardens, and the modern equipment of the city play grounds, and the water works. At the side of the plant, over a rock ledged bank runs Mill Creek, broken by a dam. The creek with its falls is not only scenic but a haven for fishermen. From it the city gets its water supply.

The building of the municipal plant, designed by the E. T. Archer engineering firm of Kansas City, Mo., takes on the quality of what it produces—light and power. It is strongly constructed of steel, concrete, and brick, yet lighted and ventilated by exceptionally large window areas. The grounds about it are a continuation of the park and show faultless grooming. As one enters the plant, on the main operating floor are, in the order named, the original 300 hp. and the 150 hp. generating units and the additional 375 hp. Diesel. All are of Fairbanks-Morse manufacture, 14 in. x 17 in. bore and stroke, at 300 rpm. Each is equipped with a Woodward Isochronous governor. The air sup-

ply is from Fairbanks, Morse & Co. engine and motor driven air compressors. For a small plant one is pleased to note the use of an overhead hand geared Wright traveling crane. This traveling crane had been added out of earnings since the plant was originally installed. Maxim exhaust silencers are used along with Alnor pyrometers for the exhaust system. The closed cooling system consists of a Marley tower and heat exchangers along with Fairbanks-Morse centrifugal water pumps for raw and soft water. Jacket water is treated with Sand-Banum. Switchboard equipment was supplied by Marquette, using Roller-Smith instruments and Allis-Chalmers voltage regulators. It occupies a large proportion of the wall and is flanked by the office to the left of the entrance and the locker room and repair room at the exit. Lubricating oil reclaimer is manufactured by Midwest Manufacturing Company. The city uses Standard Oil Company Diesel fuel oil and Standard Oil Company (Indiana) Nonpareil HD lubricating oil. Water line valves have been supplied by Jenkins, and air intake filters by American Air Filter Company, and Copus.

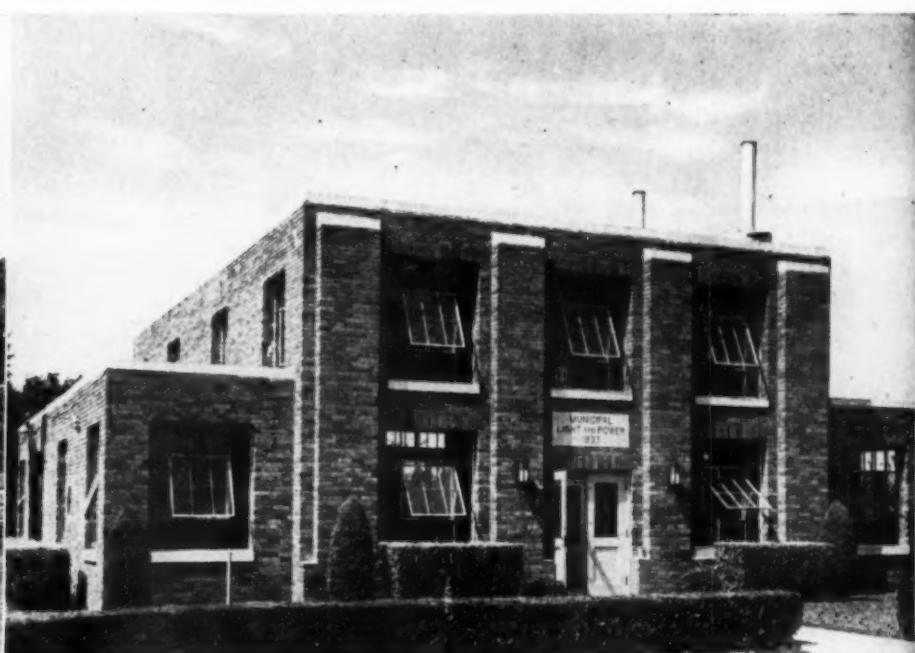
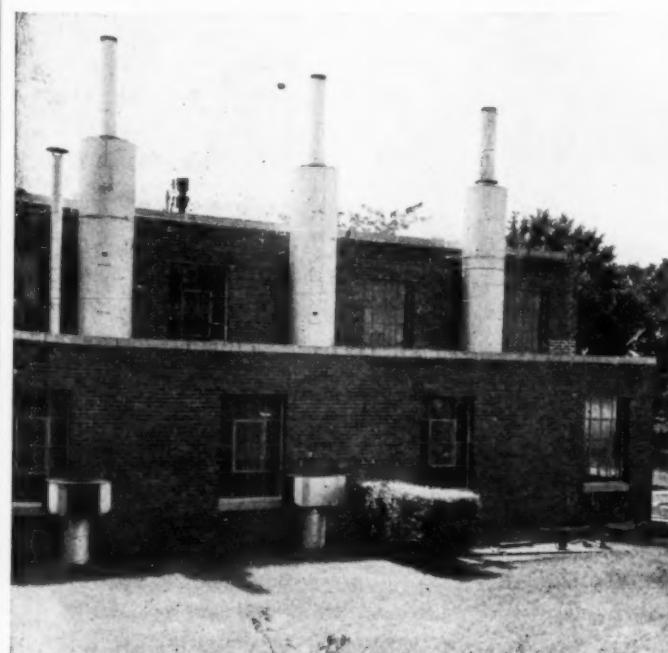
From the day the first switch was thrown to set the plant in operation Eugene Callaway has

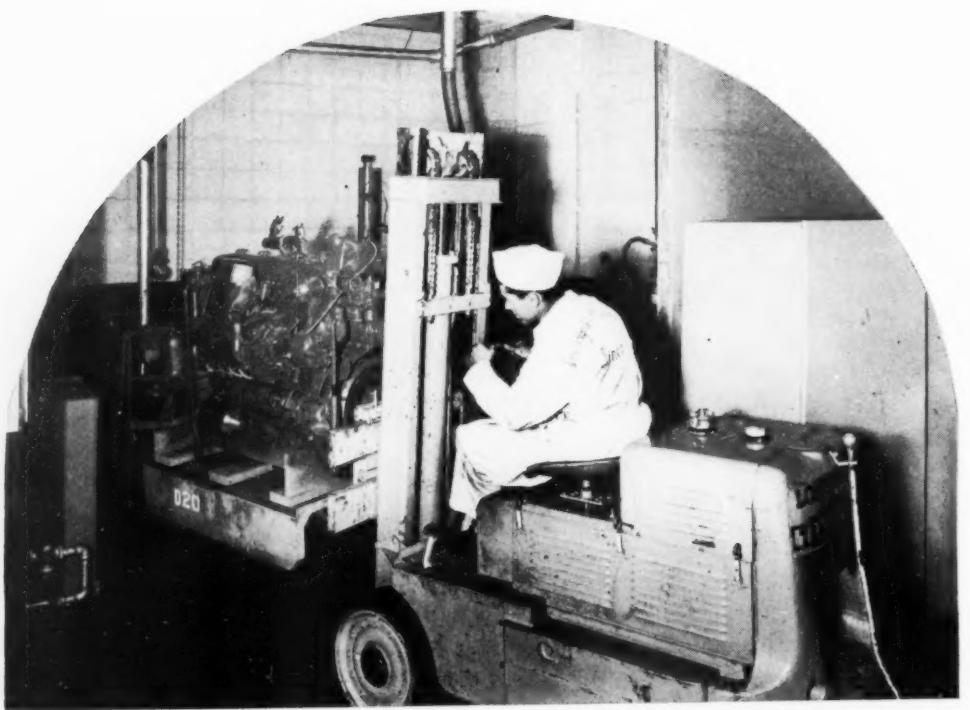
been the plant superintendent, and to him is due much credit for the efficient operation and maintenance of the utility. Mr. Callaway has devised a file so complete that one can turn to any hour of any day within the ten years of the plant's operation and put his finger on the complete story of its functioning, even to such outside influences as the weather. One feature of the maintenance under his supervision has brought particularly noteworthy results. It is his policy to renew the two top piston rings once a year when the pistons are pulled for inspection and cleaning. "The top rings receive so much heat," he writes, "that in removing them, they become slightly distorted and will not fit the cylinder wall perfectly when replaced. That is the reason we replace them each time the pistons are pulled. The lower rings do not receive so much heat and are not so easily distorted. The top rings that we have replaced have shown but very little wear."

To illustrate the results, investigation of the 300 hp. Diesel on April 14, 1947, after the engine had run 42,619 hours, covering this operation, reveals that the greatest wear on any cylinder was .009 of an inch. This plant was well worth fighting for.

Built by the determination of townspeople Washington Municipal Light and Power plant now returns \$15,000 a year profit.

Rear view of Washington plant showing two Maxim exhaust silencers (left) and Fairbanks-Morse exhaust silencer (right).

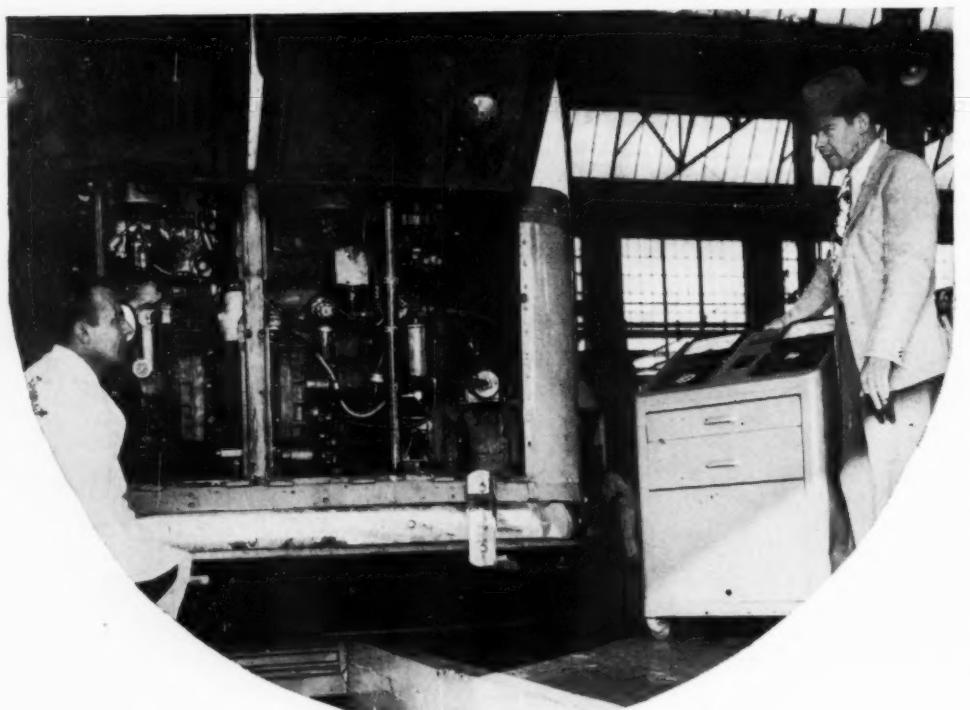




Overhauled Diesel on way to Dynamometer room of Los Angeles Transit Lines shop.

## THE DYNAMOMETER AND FLEET MAINTENANCE

**Chassis dynamometer checks all buses before going on road making sure of performance.**



**B**ARNEY LARRICK is the fast moving, colorful Operating Manager for the Los Angeles Transit Lines. He is the man whom the Brothers Fitzgerald sent to Los Angeles when they purchased the Los Angeles Railway in 1945. Upon his shoulders fell the job of streamlining and building an efficient, modern transit system from a company which had not paid a dividend in years. The record is proof that he accomplished his purpose, for today the Los Angeles Transit Lines is considered one of the most efficiently operated companies in the U. S.

Barney ordered everything brightened with paint. The buildings were done in soft green with white, and the cars and coaches in the Fitzgerald color scheme of white, green and yellow. He then got his top men together and combed the company for men with ideas. Many of these ideas were put into practice and some have saved considerable money. Where machines were needed to simplify the work of the mechanics and shop crews, they were introduced. Barney developed preventive maintenance in the mechanical end to such a degree that 75% of costly road calls were eliminated. A big part of that preventive maintenance program was the installation of five dynamometers on the Los Angeles Transit Lines property. They were supplied by the Clayton Manufacturing Co. Three of these are chassis dynamometers and the other two are engine dynamometers. Barney calls the latter two the "Dynah Twins." They sit facing each other in the "Boodwar," a name which he has given to the sound proof room built in one corner of the Unit Overhaul Department of the huge South Park Shops. Two heavy, sound proof doors can close up this room and keep the working of the twins from reverberating through the shops, although the celotex material on the walls and ceiling reduce vibrations to a minimum.

The twins are used solely for breaking in motors which have been completely overhauled. They actually simulate road conditions under full throttle. It takes only three hours to completely break in a Diesel engine. A trip with "Dynah" is comparable to a road test under severest conditions, and everything that can be done on the road is done on the dynamometers. Outside the sound proof room are two 2,000 gallon tanks containing fuel, one for Diesel fuel and one for gasoline. A 50 gallon tank sits just outside and is kept full by constant circulation, making sure that the dynamometers never run out of fuel. The dynamometers are spaced so that one may be turned off while the other is testing. Exhaust flues carry the fumes up out of the room.

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Because an engine, for proper testing, should be set on the dynamometer in the same position as it rides in the coach, two of our shop men have built special cradles for the various engines. These cradles were built from scrap engine hangars lying around the shop. They simplify the setting up procedure to a great extent, as all that is necessary is to set the engine in the proper cradle, bolt it to the dynamometer by the four anchorage bolts, two at each end, turn on the machine, and "Dynah" shore does the job. No check has been made as to the amount of money that the twins have saved for the company but one can get a fair idea from the fact that if a "sour" engine is discovered on the dynamometer, it can be corrected before it is put into a coach. If a blow-by, an oil leak, a water leak, or a knock is discovered before the engine is put into the coach, it saves at least the amount of time taken to remove that engine from the coach and put in another, for most of these faults could only be found under a road test. This means that each sour engine discovered by the dynamometer saves sixteen hours of labor. This is exclusive of the cost of road calls or any other maintenance work.

The unit overhaul department of the South Park Shops averages forty complete overhauls per month, and each of these forty jobs is tested completely on the dynamometers. Very few of these have come back off the road for any major ailment. One man operates the dynamometers. The motors are brought into the "Boodwar" by the Clark lift. An overhead crane sets them easily into the cradles, making it possible for this one man to do the complete job. Both dynamometers can operate at the same time. When the twins are through with their jobs, the engines are taken from the "Boodwar," given a complete paint job and stand ready to replace some other engines, for the coaches are never idle. The dynamometers duplicate temperatures, expansions and stresses identical with those developed in actual road tests. Working surfaces have taken on their operational shapes. Everything is now moving in the groove. It is possible to make final adjustments on the engine under this ideal arrangement. A finished engine comes out of the "Boodwar," ready for peak road service—a dependable, smooth working motor which can be relied upon to function satisfactorily under most exacting conditions.

Replaced parts become properly seated during the run-in. Latent trouble in distributor contacts, carburetor, fuel pumps and the like is exposed and can be eliminated by this process, thus substantially reducing costly road calls.

No two engines are exactly alike, not even new engines. Each has its own characteristics. The dynamometer allows the engine to speak for itself. The man in charge tests the individual engines for their characteristics and accurately adjusts them for peak efficiency.

The other three dynamometers are placed at Divisions 2, 3, and 5, and are used exclusively during inspections. In fact, "Dynah" does most of the testing and inspecting. She stands at the front end of the inspection pit. The coach wheels fit smoothly onto her rollers. The engine is started and she checks these things: compression, fuel pump pressures, manifold vacuum, air fuel ratios, peak power output, cruising economy and idle—all under actual

meter eliminates the hard tests in the over all inspections. Proper inspections with this machine on the Los Angeles Transit Lines property have reduced road calls by 75% in two years. Prior to the installation of the dynamometers, inspections missed many of the faults, for even the best mechanic cannot always see a little clog in an oil line or a tiny leak in the manifold gasket. A considerable number of road delays were caused by engine failures where drive line transmission and rear axles broke. Through scientific inspection with the chassis dynamometer, most of those things can be prevented.

For tune up work the dynamometer is invaluable for it enables the mechanics to analyze the



Barney Lerrick, operating manager of Los Angeles Transit Lines checks dynamometer dials during engine test.

road operating conditions. She finds many defects such as generator or regulator faults. She points out loose wiring connections, slipping clutches, engine governors, or any ignition defects. A plugged muffler, air line and compressor defects, water and oil leaks not otherwise found, leaky engine valves, leaky manifold gaskets, loose rod or main bearings, transmission, differential and drive line troubles are all part of her job. Spark plugs that miss under load, often robbing an engine of as much as 15 horsepower are discovered by the dynamometer. Distributor governors and even dragging brakes, air cleaners needing servicing, and many, many other things show up.

These are a few of the things that "Dynah" does, and the boys on the inspection pits discover many more uses daily, for the dynamo-

meter's condition in its entirety. It enables the company to put into operation only coaches which are fit for road performance. The saving in man hours as well as the saving in materials and parts has not been tabulated but it is considerable. The increase of mileage per gallon which there has been since the installation of these machines is also considerable and when you consider the amount of fuel used by a property the size of the Los Angeles Transit Lines, that is truly an important item.

One thing of note is the fact that many imperfections in the chassis can be discovered on the dynamometer for the minute the coach rolls onto the dynamometer, it lines itself up. If it doesn't line itself up, there is a broken spring or a loose bolt sheared off somewhere. Moreover, the dynamometers never need inspection.

# SUPERVISING & OPERATING ENGINEERS' SECTION

Conducted by R. L. GREGORY\*

## "Unit installation and its effect on Daily Operating Problems" Part 6.

**W**ITH the completion of the installation of the cooling system headers and the exhaust header, the next step in installation was the placing of the platform support brackets, toe plates and sections of platform around the upper part of the engine. This was done on both ends and over the exhaust header, and gave the erectors a chance to better handle the following equipment.

With this material in place the next item to be added to the engine was the camshaft housing, followed by installation of the camshaft. It is of vital importance that these two pieces of equipment are in proper alignment with respect to the rest of the unit. Therefore considerable time and patience were involved in bolting up and installation of the camshaft housing which supports the camshaft bearing and camshaft. The housing was completely cleaned, bearings dismantled and cleaned with bearing caps removed and the camshaft was lowered into position. The alignment was then checked and camshaft was installed and removed several times, bearings scraped in and alignment checked and rechecked until this shaft was perfectly free in the bearings with no binding or pinching when turned in the bearings.

Figure 1 shows the camshaft after final alignment. Note the large camshaft gear to the fore of the cut. This gear is driven by means of an idler gear, which in turn is actuated by the crankshaft gear which is fastened directly on the crankshaft. One can easily appreciate the necessity of proper alignment and the care required in the assembly of this drive, in order that all parts may function freely. Other parts noticeable on the camshaft are the fuel pump cams and the driving gear for the individual Manzel lubricators.

In the foreground in front of the camshaft gear, the mechanism for the automatic safety stop control can be seen. This will be discussed further, in relationship to the governor and governor linkage, and governor control shaft. When the erectors were finally satisfied with

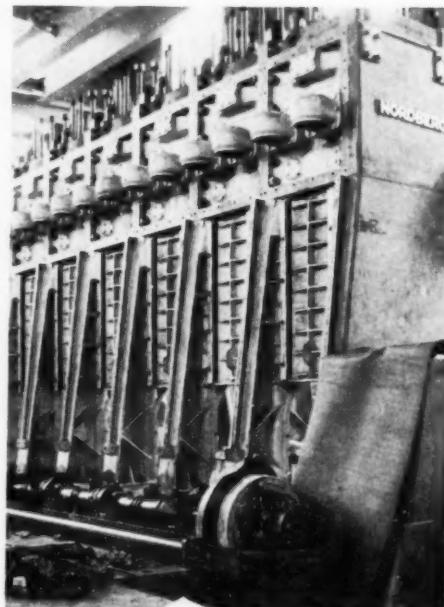


Figure 1.

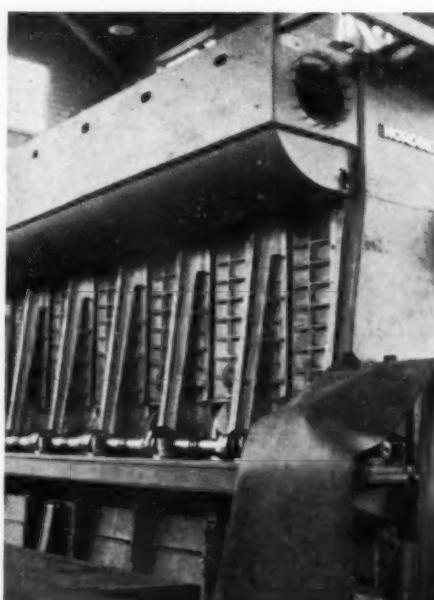


Figure 2.



Figure 3.

weight, the length and bulk of this piece made it rather difficult to handle. It is of vital import that this header be tight, so all surfaces were gone over for burrs or blemishes, which if found were filed off, then the contacting surfaces given two coats of glyptal and the header bolted firmly in place.

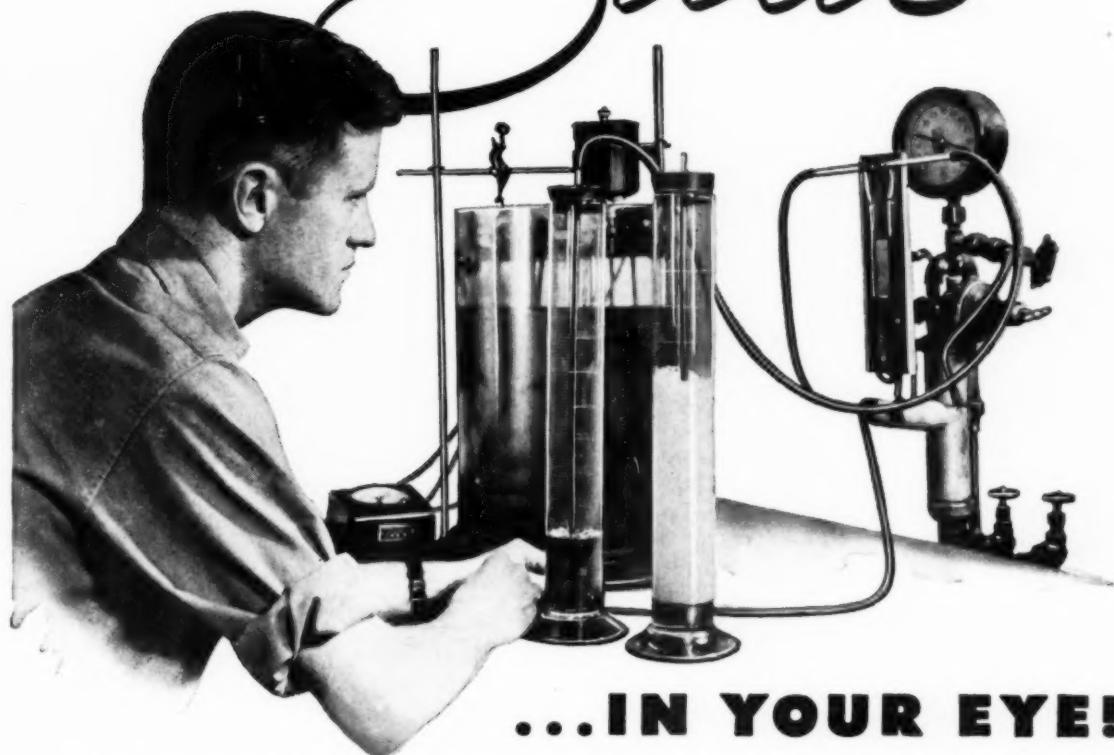
After this was accomplished the header was given a final cleaning internally and two coats of white Florhicle enamel applied to the internal surfaces. Note the opening in the near end of the header. This opening accommodates a spring loaded explosion plate valve, similar to those installed on the rear door of each cylinder. Doors of this nature are generally installed on Marine units and are known as "Marine Inspection doors," the purpose of which is to release gases in case of a crankcase explosion, thus keeping damage at a minimum. In instances where these explosion valves have not been in use, and the doors have been of solid construction with no vent for explosive gases, serious damage has been known to occur not only to the doors but also to other parts of the unit.

With the scavenging header in place, the next step in erection was the installation of the platform supports, toe plates and platform above the scavenging header. This was followed by . . . And now please turn to page 72 . . .

\* Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.

HERE'S

Suds



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The suds very much in your eye as you look at the photograph above is lubricating oil which foams badly and, if used in valuable equipment, constitutes a hazard to positive lubrication, which can increase maintenance costs.

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# Exchange Your Diesel Maintenance Ideas

Conducted by R. L. GREGORY

## "MAINTENANCE AS APPLIED TO CYLINDER LINERS"

*Editor's Note: In this department we provide a meeting place where Diesel and Gas engine operators may exchange mutually helpful maintenance experiences to keep our engines in top condition. Mr. Gregory edits your material and adds constructive suggestions from his own wide experience. This is your department—mail your contributions direct to DIESEL PROGRESS.*

In the past we have had several discussions in this section on cylinder liner leaks and the maintenance of cylinder liners. This still continues to be quite a problem on larger units of 21 inch bore and over. The sketch shown in Figure 1 shows the old conventional way of sealing the joint between the liner and cylinder block, by means of a thin copper gasket. This did not prove to be too satisfactory, since eventually this thin copper gasket would squeeze out between the block and the liner and the first thing you knew you had a leak at this point.

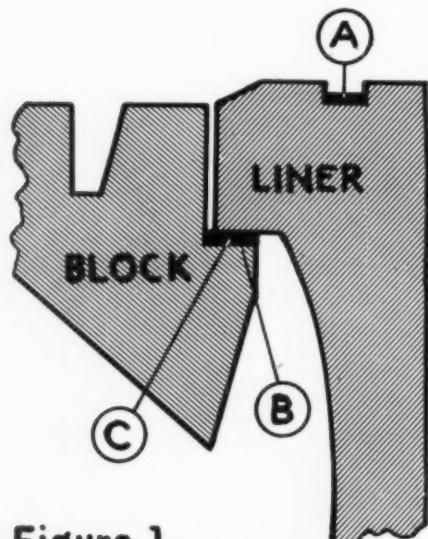


Figure 1

Fig. 1. C, Conventional copper or serrated steel gaskets. B, Seat subject to corrosion. A, Cylinder head gasket.

Some manufacturers tried to correct this situation by use of a steel serrated gasket located in the same place. While this type of gasket showed an improvement over the copper gasket it still did not solve the problem in its entirety and leaks at this joint still occur occasionally.

Since in most large units, this seat is not over

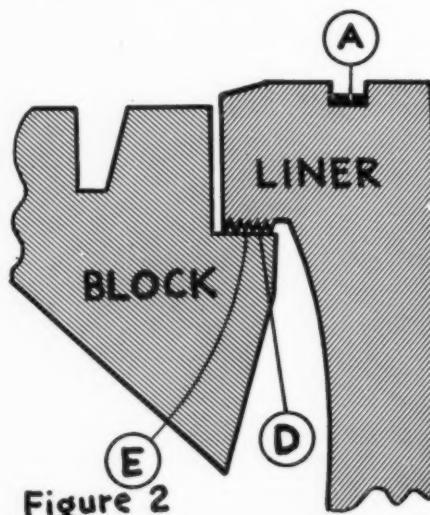


Fig. 2. A, Cylinder head gasket. E, No gasket used; expansion and contraction of liner wipes seat. D, Bottom of liner serrated.

1/2 in. in width, and since this seat is subject to corrosion, many of these seats become pitted from oxidization after a few months wear. Once this situation arises, it is almost impossible to secure a tight fitting joint until this seat has been resurfaced either by means of a boring bar or by lapping in. One engineer made quite a novel device for lapping in this seat. He took an old liner and cut it off right at this joint in a lathe. Then he installed two bolts about two feet long in the bolt holes provided for lifting the liner, and put a wooden bar across the top from one bolt to the other, thus making a handle for turning the device. When he pulls a liner, he places the top of this old liner on this seat and by means of grinding compound laps the seat in again. This is a mighty good idea if the seat is only slightly pitted and gives a good lapped in surface for the new gasket.

However engineers have gone to another method of keeping this joint tight, which method may prove to be more practical. There is a certain amount of come and go of the liner in the way of expansion and contraction at this joint on the block. One company has now done away with any gasket at this joint and in its stead, with a good surface in the block, have serrated the under part of the liner as shown in Figure 2. Their theory is that by

serrating this joint, the expansion and contraction of the liner will keep a wiped joint at this point. This may do the trick and unless oxidization occurs at this point and ruins the seat in time, no leak should appear at this joint during the life of the liner.

### "Moisture Troubles"

This department recently received a letter from the owner of a small milk processing plant in the Middle West, in which he stated that he had two small high speed Diesels in his plant which had been operating very well for several years. Recently, however, he ran into a lot of trouble with these two engines, poor combustion, poor lubrication and, all in all, he had several complaints on general operating conditions. He wanted some advice on what to look for, as he felt that the men around the plant were not capable of determining just what had gone wrong.

As the author has often stated, it is a difficult thing to diagnose engine troubles without seeing the actual operating conditions and the characteristics of the plant. However we did have more or less of a bright inspiration. The same lubricant vendor who handles part of our oil business makes the territory in which this milk plant was located. He called on us shortly after we received this letter and was shown the correspondence and since he was headed that way, said he would make an investigation.

A couple of days ago we received a letter from this salesman. He arrived at the aforementioned plant and went over the situation with the plant owner. He found the conditions as stated were not over exaggerated and that they were having real difficulties. The trouble finally simmered down to this. The plant had a couple of fuel tanks for storage—25,000 gallon tanks—and they also bought their lube oil in quantities and stored it in a separate lube oil tank. These tanks hadn't been cleaned for years. Consequently they had accumulated a lot of moisture, which had risen to a point where it was mixing with both fuel and lubricant. Having no centrifuge and depending entirely upon wire strainers and self cleaning . . . And now please turn to page 72 . . .

# Cut Engine Trouble, Wear, Breakdowns, Teardowns-- *with Fram Filters and Cartridges!*



## FRAM HEAVY-DUTY LUBE OIL FILTERS

Engineered for efficient, adequate, economical filtration of lubricating oil on practically any type of Diesel, gasoline or gas engine.

Fram heavy-duty lube filters remove dust, dirt, grit, sludge and abrasives from oil, minimize wear, cut breakdowns. Thus, Fram saves overhauls, repairs and costly delays — lengthens the life of engines.



## FRAM FILCRON FUEL OIL FILTERS

Made in two sizes to service all types of Diesel engines. May be used individually or in multiple to meet any desired capacity. Scientifically designed, guaranteed to remove all solid particles from fuel.

Fram Filcron Fuel Oil Filters contain the amazing Fram Filcron cartridge, which proved itself an outstandingly efficient filtering agent in widespread Army and Navy use during the war. Made up of stacked cellulose discs, the Filcron cartridge removes particles as small as one micron (.000039 of an inch) in size . . . thus provides absolutely clean oil to injectors, saving maintenance and money.

For information on Fram Lube or Fuel Oil Filters, write: Fram Corporation, Providence 16, R. I. In Canada: J. C. Adams Co., Ltd., Toronto, Ontario.



# FRAM OIL AND MOTOR CLEANER

*Cleans the Oil that Cleans the Motor*

## Ten Years . . . *continued from page 33*

coat thick America's vast network of light traffic branch lines with Diesel rail cars that can compete with trucks and buses, and operate with a crew of three—mixed as passenger, mail, express, milk, way freight—all on one Diesel railcar or railcar and trailer.

But so long as the railroad Brotherhoods demand an engineer, fireman, brakeman, conductor, baggage and express clerk, a flagman

and a valet to polish the signal lanterns—all on one single 90 ft. Diesel railcar, in the phoney interests of "safety"—some 30 of our 48 states will watch its branch railroad trackage gather weeds and the railroad unions will be deprived of 200,000 employment who pay their dues too, and 200,000 bus drivers and truck drivers will be doing the work the railroad Brotherhood should be doing.

With permission of the publisher of this jour-

nal, we venture the opinion in 1947 that before five years elapse, the U. S. railroads will reverse their branch line policy and start out to build branch line traffic on a basis of "at cost" or "break even" and go back to the railroad's grass roots to do battle with the highways. Unless this is done the U. S. railroads will become a network to serve some 300 terminal cities, leaving 75,000,000 of our voting, thinking, worrying population blindly, in the absence of railway service of any kind, to kick the whole remaining U. S. railroad industry out the window and abandon it entirely. Already huge areas of the U. S. A. have two generations grown up who have never used a railroad.

A dangerous public relations lapse that may cost them their very lives in the onrushing of 6-lane federal highways; cornfield airlines and private automobiles. Once lost, these people who don't know what a railroad is, aren't interested in railroad problems, so "out of sight—out of mind" let's kick all railroads out the window.

A nation in this frame of mind will be hard to sell on socializing the railroads. Why socialize? Simply let 'em go bust.

A cue to the future: two-thirds of the Congressmen and Senators now sitting in Washington, D. C., are forced to travel back and forth from their constituents by airplane because of inadequate railroad service.

Four-fifths of the total membership of state legislatures travel from their elected districts to their state capitals by private automobile.

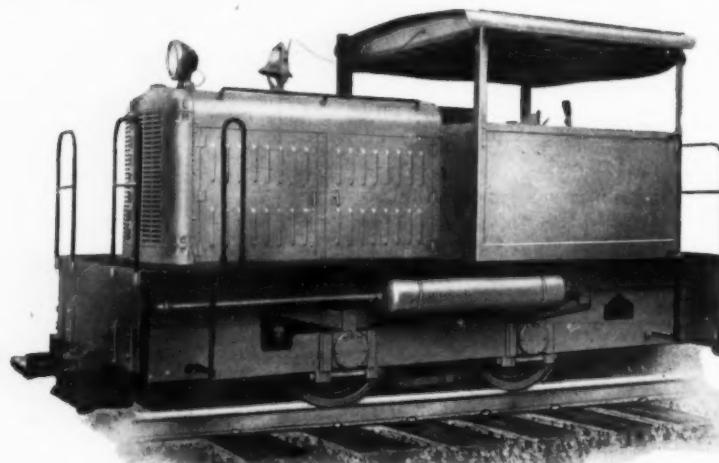
Ninety per cent of today's high school crop have never been on a railroad train.

### New Witte Catalog

THE Witte Engine Company recently has released a new catalog illustrating and describing the complete line of Witte Diesel engines and "Dieselectric" plants. Witte engines are offered in 4, 6, 9, and 12 hp. models of single cylinder four cycle design. They are all equipped with the Witte precombustion chamber which makes for easier starting in cold weather. The "Dieselectric" plants range from 2.5 kw. to 8 kw. capacity DC. AC plants range from 3 kva. to 10 kva. and are equipped with constant voltage generators.

A copy of the catalog, Number 11, is available by writing the Witte Engine Works, Kansas City 3, Mo.

## DERAILMENTS MEAN LOST TIME AND MONEY



"On the ground" situations seldom apply to Whitcomb Locomotives. They actually seem able to follow the rails anywhere. Sharp curves, temporary road beds, light rail, uneven or rough tracks hold no fear for these versatile work horses. Scientifically designed, the weight of each Whitcomb locomotive is evenly distributed with a remarkably low center of gravity.

Many Whitcomb Diesel mechanical models with rigid wheel bases as illustrated are equipped with 3 point spring suspension providing cross equalization. This arrangement enables the wheels to conform to the vertical irregularities of the track, reducing the possibility of derailment by preventing too great a concentration of weight upon one rail. It also permits maximum adhesion and greater tractive effort, because all the wheels remain in contact with the rails all of the time.

So for tough car spotting, hauling or switching assignments involving rough trackage, where larger, heavier locomotives would be flirting with trouble—better send a Whitcomb to do the job quickly and economically.

**Diesel Locomotives: Electric drive 25 to 95 tons,  
Mechanical or Hydraulic drive 3 to 30 tons.**

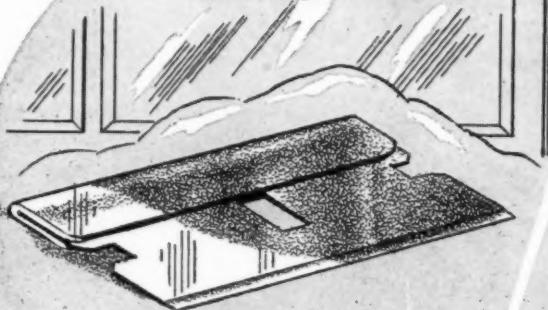
**THE WHITCOMB LOCOMOTIVE CO.**

PARK & PROGRESS STS., ROCHELLE, ILL.  
SUBSIDIARY OF THE BALDWIN LOCOMOTIVE WORKS



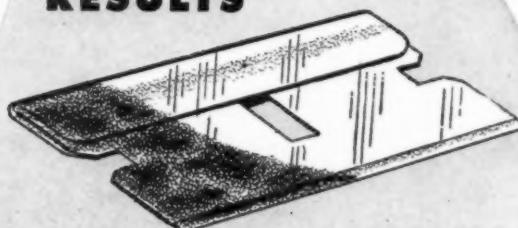
# How to PREVENT Corrosion

## MAKE THIS SIMPLE TEST



Coat a section of an old razor blade or any piece of raw metal with a protective film of Anti-Corrod. Place it out-of-doors, and leave exposed to the elements.

## SEE THE AMAZING RESULTS



Rain, snow, changing temperature, dust and grime have eaten into and oxidized the unprotected metal. But note surface under Anti-Corrod film—bright and unharmed, in its original state.

**Cities Service Anti-Corrod**es are safe rust and corrosion preventives that bring amazing results. They are reliable safeguards against corrosion of metals in any form or state of finish—whether in storage or in transit. These Anti-Corrod form a tenacious, durable film that is impervious to moisture and the more common gases prevalent in the atmosphere. And, since they contain lubricating material, they need not be removed in drawing operations. These Anti-Corrod are made in several types to meet a wide range of service conditions. They are economical, easy to apply and can be removed with kerosene or any petroleum solvent.

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Mail this  
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Today!

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Recently, we announced the development of Cities Service Rust Remover, and the response to our demonstration offer far exceeded expectations. Rust Remover, of course, removes rust. Anti-Corrod is designed to prevent rust and corrosion. Together, they will safeguard your equipment and production!



**CITIES**  
  
**SERVICE**

Cities Service Oil Co.  
NEW YORK • CHICAGO  
Arkansas Fuel Oil Co.  
SHREVEPORT, LA.

**Unit Installation** *con't from page 66*  
the installation of the scavenging valve assembly. There are eighteen of these scavenging valves, two to each cylinder.

While the foregoing parts were being installed, other workmen were busy installing the hand railing around the top of the unit, the down section of the exhaust header and the stairway which leads from the operating floor to the top of the unit. These parts are shown in Figure 3.

Some of our readers may ask what all this erection detail has to do with daily operating problems. The answer to this is that it is the intention of the writer, first to give a full detail description of the progress of erecting, and then in a general summary, point out the points in erection which may reflect upon daily operating problems. This type and size of unit was taken as an example, because this type and size of unit are becoming very popular with municipal plants and utility stand-by stations. They are

not the largest Diesels manufactured, yet they are of ample capacity to handle the ordinary loads met in municipal plants.

**Maintenance** *continued from page 68*  
strainers they began having troubles.

The salesman suggested that they empty one of the fuel oil tanks which was nearly empty at any rate, clean it out thoroughly and also draw off his lubricant into barrels and see what the condition of the lube oil storage was. This was done and all concerned were much surprised at the accumulation of moisture and emulsion found. After giving his storage tanks a good cleaning, filling them with fresh products, his engines returned to normal operation and his trouble was eliminated. All of which goes to show that one cannot be too careful in the matter of keeping fuel and lube oil tanks in as clean a condition as possible.

#### "Another Suggestion on Cleaning Pistons and Liner Walls"

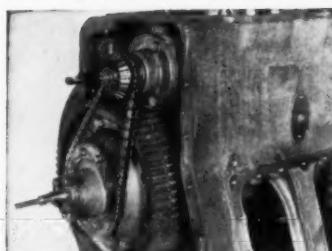
We are all familiar with the grime and dirt connected with cleaning up pistons and cylinder walls, when overhauling an engine. Several different items have been mentioned and ways of removing the varnish on both pistons and cylinder walls. Some use kerosene to cut it, then go over the surfaces with a fine grade of emery cloth soaked in kerosene.

We have found that a good grade of liquid chrome or a good grade of brass polish such as is used around the engine room for cleaning copper and brass piping valves, etc., is about as good an item for cleaning this varnish as can be found.

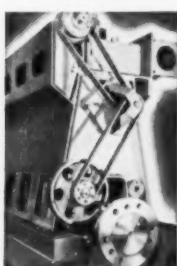
If one has a portable grinder with a long flexible shaft and can first go over the surface with a fine wire buffing wheel to remove the heavier coating, then finish off with the polish, they will have an excellent finish on all surfaces when completed. It is always good practice after finishing with the polish to wash the surfaces with kerosene or some good grade of oilade so that any polish left in cleaning will be removed.

Another suggestion which follows right along with this concerns the installation of piston rings after the piston has been thoroughly cleaned. In installing piston rings oftentimes they are installed by workmen with sweating hands. After the rings are installed it is always a good idea to wipe the piston down well and apply some such agent as oilade or kerosene to the surface.

## FOR CHAIN . . . THE INDUSTRY COMES TO LINK-BELT



Link-Belt Silent Chain used on governor drive of Diesel Engine.



Link-Belt Silverlink Roller Chain Drive on Joshua Hendy Series 50 Diesel engine, making possible the simpler overhead camshaft construction.



**LINK-BELT**  
*Diesel*  
**CHAIN DRIVES**  
SILENT AND ROLLER TYPES

#### LINK-BELT COMPANY

Detroit 4, Indianapolis 6, Chicago 9,  
Philadelphia 40, Atlanta, Dallas 1,  
Minneapolis 5, San Francisco 24, Los  
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Offices in Principal Cities. 10,000

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page 68

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30-ton Euclid truck  
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Detroit Diesel  
Model 3-71  
power unit

## DONALDSON HEAVY-DUTY MUFFLERS

MADE BY THE WORLD'S LARGEST MANUFACTURERS OF HEAVY-DUTY AIR CLEANERS

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ENGINES EFFICIENTLY**

with the NEW DONALDSON

### HEAVY-DUTY MUFFLER

For gasoline, Butane and Diesel engines . . . 25 to 350 H.P.

MUFFLES EXHAUST "BARK"

- COMPACT
- WILL NOT BURN OUT
- MINIMUM POWER LOSS
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- ALL-WELDED CONSTRUCTION

The new Donaldson heavy-duty muffler was developed for power equipment operating in the iron ore pits of the Mesabi range. Installed on trucks, this specially built muffler effectively absorbed exhaust "bark" or "crack" from high output engines, which was causing early operator fatigue and annoying those people who lived near the job site.

Compact, built to resist exhaust temperatures of 1500 F., the Donaldson muffler cuts objectionable noise with a minimum of power loss. It's the answer to muffling problems on over and off-the-road trucks, on shovels, cranes, stationary power units and other equipment.

Let us show you how this new muffler can add a valuable selling feature to your heavy-duty power equipment.

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Sales Engineers: Chicago, Cleveland, Detroit



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# GENERATORS AC and DC



DC generator (left) two - bearing, self excited type can also be furnished with direct connected exciter. Both AC and DC generators can be furnished in the single bearing flange-mounted type for special mounting requirements. Ball bearing construction is used throughout. Complete data upon request.

Well-known for their rugged design, efficient performance, long life and minimum maintenance, whether powered by electric, gasoline, or Diesel equipment. Backed by over 1/2 century of manufacturing and designing experience, Kurz and Root generators are now serving industries throughout the world.



Illustrated are AC generators, only 2 of the many different types developed and

designed to fit specific needs and applications. (upper left) two-bearing self excited type; (lower right) two-bearing direct connected exciter type.



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This is an actual photograph of the intake ports of a bus diesel engine. This clogged condition means . . . . .

**SMOKY EXHAUST•HARD STARTING  
POOR PICK-UP . . LOW EFFICIENCY**

**NINE DAYS LATER**

After using 75c worth of MISOL (in the fuel) the same parts looked like this . . . . .



### The Miller Diesel Fuel Additive

The proven cure for 90% of all diesel fuel system problems.

Descriptive Literature and full information on request  
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# MISOL

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### D.E.M.A. To Hold Third Marine Conference

THE Diesel Engine Manufacturers Association will hold the third of its series of marine conferences in Boston, Mass., on Sept. 12. Key representatives of marine interests will be invited by the manufacturers to spend an informal day with them on that date at the Copley Plaza Hotel, to tell their experiences with Diesels and to state explicitly what their power needs are.

The manufacturers will outline to the ship-builders, ship operators and naval architects what they have to offer in the way of engines for both propulsion and auxiliary purposes. The session will be concluded with a question and answer period.

Speakers who have been invited to appear on the program include W. S. Newell, president of Bath Iron Works, Bath, Me.; Irwin Usen, president of Usen Trawling Co.; J. L. Alphen, president, General Sea Foods; Frederick B. Craven, manager marine department, Mystic Steamship Division, Eastern Gas and Fuel Associates, and vice president Boston Towboat Co.; and Adm. E. L. Cochrane, who at the time of the meeting will be head of the Naval Architects School of Massachusetts Institute of Technology.

Presiding at the meeting will be E. J. Schwanhauser, vice president of Worthington Pump and Machinery Corp., and president of Diesel Engine Manufacturers Association. The question and answer period will be conducted by Robert H. Morse, Jr., vice president and general sales manager of Fairbanks, Morse & Co.

The first of the series of marine conferences was held by Diesel Engine Manufacturers Association at San Francisco last November. In March of this year the second conference took place in New Orleans. Both sessions attracted large audiences of maritime men, who showed keen interest in the programs.

### North Carolina State Offers Diesel Short Course

A 12-WEEK short course in Diesel operation and maintenance will be given at North Carolina State College, Raleigh, N. C., beginning September 27, according to an announcement by Edward W. Ruggles, director of the college's Extension Division. The course will be conducted by the college's School of Engineering and will include a wide variety of subjects involving the various processes in the Diesel field.

The weekly Diesel fund print ready and other obtained are eligible under the p Cost of the ing tuition incidental exp

Enterprise Hendy

C. S. HEL of the Enter of San Fran that the co line of He engines for Hendy Iron Suppleme Diesels, the Enterprise sales activit

There will b of sales, ma Hendy engi Diesels are g availability o of the Hend

With Enter throughout a large distri for the effici provided. E company is a su

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The weekly schedule of instruction will include Diesel fundamentals, shop mathematics, blueprint reading, fuel inspection, shop drawing and other topics. Application blanks may be obtained from Ruggles' office. Veterans, who are eligible for training may take the course under the provisions of the GI Bill of Rights. Cost of the course is estimated at \$400, including tuition fees, board, room, books and incidental expenses.

## **Enterprise Acquires Hendy Diesels**

**C. S. HERBERT**, Executive Vice President of the Enterprise Engine & Foundry Company, of San Francisco, California, recently announced that the company has acquired the complete line of Hendy marine and stationary Diesel engines formerly manufactured by the Joshua Hendy Iron Works of Sunnyvale, California. Supplementing the extensive line of Enterprise Diesels, the Hendy line of engines will enable Enterprise to expand its manufacturing and sales activities into broader fields.

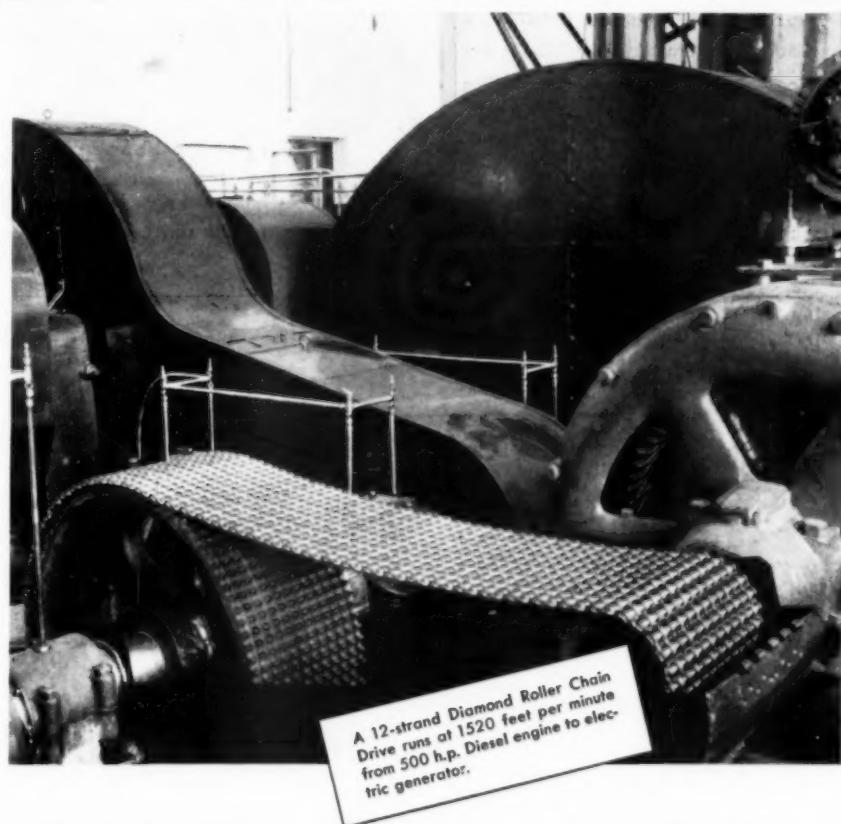
**There will be no interruption in the continuity of sales, manufacturing, and servicing of the Hendy engines. The present owners of Hendy Diesels are given every assurance of continued availability of parts and service for all models of the Hendy line.**

With Enterprise branch offices at key points throughout the United States supplemented by a large distributor organization, every facility for the efficient handling of sales and service is provided. Enterprise Engine & Foundry Company is a subsidiary of Transamerica Corporation.

## **General Machinery Corporation Plans Merger With Lima Locomotive Works**

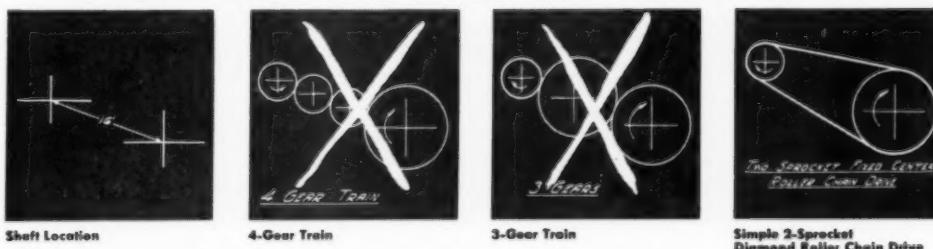
THE planned merger of the Lima Locomotive Works with the General Machinery Corporation was announced recently in a joint statement by the heads of the two firms. This merger will definitely mark Lima's entry into the Diesel locomotive field. As soon as the plan is approved by the stockholders of the two companies this Diesel locomotive building program will begin. The announcement also disclosed that General Machinery has developed a free-piston gas turbine generator which has direct application to locomotives, ships and stationary power plants. Both concerns are firmly established in their fields. Lima locomotive was established in 1869, while General Machinery was founded in 1845.

## No. 6\* of the Diamond Diesel Drive Dozen



# **GENERATOR DRIVES**

**With Diamond Roller Chains,  
Shaft Center Distances No Problem**



**Smoothness, quietness, long use with little maintenance are essential—and DIAMOND Roller Chains are obviously superior to gears for generator drive service.** Then, too, distance between shafts introduce

Then, too, distance between shafts introduce no problem—and not depending on friction, bearing pressures are lower and wear minimized very appreciably . . . Diamond Drives are ideal—Another of Diamond Diesel Drive Dozen applications. **DIAMOND CHAIN COMPANY, Inc., Dept. 407, 402 Kentucky Ave., Indianapolis 7, Ind.** Offices and Distributors in All Principal Cities.

**OTHERS OF THE DIAMOND  
DIESEL DRIVE DOZEN**

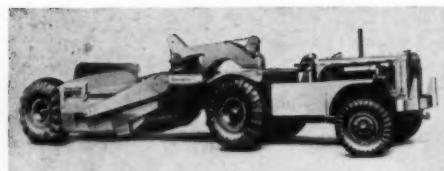
1. Camshaft Timing Drives
2. Fuel Injection Pump Drive
3. Lubricating Oil Pump Drive
4. Fuel Supply Pump Drive
5. Water Pump Drive,  
Fresh and Salt Water
6. (See illustration above)
7. Exciter Drive
8. Governor Drive
9. Air Compressor Drive
10. Tachometer Drive
11. Supercharging Blower Drive
12. Power Take-off Drive and Marine



**Caterpillar Announces New Diesel Tractor-Scraper Combination**

A NEW earthmoving team has been introduced by Caterpillar Tractor Co. with the announcement of production of a new "Caterpillar" Diesel DW10 wheel-type tractor, a new "Caterpillar" No. 10 scraper and a new "Caterpillar" No. 21 cable control unit.

This latest announcement of product develop-



Caterpillar Diesel DW10 Tractor and Caterpillar Number 10 Scraper

ment focusses on the power increase available in the DW10 tractor which now has a power

output of 115 horsepower at 1800 rpm. Operating with auxiliary equipment, the unit takes on a wider range of heavy off-road jobs and high speed hauls.

In highway, dam, levee and airport construction and general land-leveelling, the new tractor, equipped with the new No. 10 scraper, offers users outstanding digging and levelling characteristics; coupled with a matching wagon, it makes possible speedy handling of material ranging from all types of earthmoving to many types of mine and quarry deposits.

Among the advantages of the new DW10 over the predecessor model is the 15% increase in power output made possible through application of the new six-cylinder "Caterpillar" Diesel.

For further information write the Caterpillar Tractor Co., Peoria, Illinois.

**Powers Heads Engineering Activities at Baldwin Eddystone Plant**



Frank B. Powers

FRANK B. POWERS, Assistant to the Vice President, Operations, Eddystone Division, Baldwin Locomotive Works, has been recently given complete responsibility for all engineering activities of the Eddystone Division.

**Nordberg Opens New Orleans Office**

A NEW district office of Nordberg Mfg. Co. of Milwaukee has been opened in the Pere Marquette Building, Room 904, New Orleans, Louisiana. This office is the headquarters for W. J. Moran, District Manager for the Heavy Machinery Division of Nordberg.



**A GOOD OIL FILTER**

- Has high dirt-absorbing, oil-cleaning efficiency.
- Eliminates unnecessary wear and maintenance.
- Assures extra miles of lower cost operation.

**ADDS  
"Maximum" TO ENGINE  
PERFORMANCE**

*Full-power engine performance is only possible when the lubricating job is done by oil that is thoroughly and consistently cleaned by a filter built for the job.*

When engines are kept clean, gum and sludge formations have less chance to accumulate and mechanical overhauling is

kept to a minimum. A good filter is directly responsible for s-t-r-e-t-c-h-i-n-g engine life, cutting replacements and reducing maintenance.

MICHIANA Filters have long proved their efficiency, at home and throughout the world, on all types of engines, trucks, buses, and motorized equipment. When it comes to economy in oil consumption and efficiency in oil cleaning there is no question of choice—it's MICHIANA.

Replacement of element or filtering material makes a MICHIANA Filter good as new. Write for Bulletin 45-D to MICHIANA PRODUCTS CORPORATION, Michigan City, Ind.

**MICHIANA  
OIL FILTERS**

Bulletin 45-D describes filters for gasoline and Diesel engines—Send for your copy today.



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OGRESS

# DIESELS PRODUCE ECONOMICALLY

By FRED M. BURT

**L**IN Oregon and Washington there are 33,000,-000 acres of farm land under production. Of the acreage under irrigation, 70 per cent is supplied by privately owned water systems with

Diesel engines doing a large part of the pumping. Much of what is now good garden land was converted from virtual desert areas through the supply of low cost water.



Diesel tractors such as shown here get crops in at a rate undreamed of in the days of horse-drawn farm implements.

Oregon's income from her 62,000 farms, of 18,000,000 acres, valued at \$477,000,000, in 1943, was \$261,117,000 exclusive of government subsidies. Washington with her 82,000 farms, of 15,000,000 acres, valued at \$593,000,000, in the same year and also without including the government payments, received \$397,619,000.

Large areas under cultivation in these northwest states, is of hilly nature, ideal for that 20th century "mule," the Diesel tractor. Whether it is disking the orchards of Washington, seeding spring wheat or pulling pea vines in Oregon, the powerful and economical implement named after a fuzzy worm does a huge day's work for a fuel cost of less than that required for a couple of "hayburners" not suffering from any digestive ailments. Furthermore, the power and speed of these Diesel "mules" in contrast to their erstwhile namesakes is beyond comparing. Diesels will play a great part in making this a land of plenty.

## *important* **DIESEL OFFERINGS** *immediate delivery*

HP	MODEL	KVA	RPM	NEW	HP	MODEL	KVA	RPM	NEW
2—2000	Fairbanks-Morse 33	1875	300	99%	3—165	Murphy ME650	145	1200	95%
8—1600	General Motors 16-278A	1200	720	95%	2—150	Buckeye Model E	145	400	95%
1—840	Fairbanks-Morse M	565	257	99%	5—100	International UD18	62.5	1200	New
2—450	Fairbanks-Morse 33E	375	360	95%	1—100	General Motors 6-71	75	1200	Unused
1—450	Buckeye Model 80	360	600	New	1—90	Cummins HIS 600	62.5	1200	New
1—375	McIntosh Seymour	350	360	85%	1—80	Fairbanks-Morse YVA	65	300	85%
1—365	Ingersoll Rand S	340	600	95%	1—75	Buckeye Model J	62.5	600	95%
4—360	Fairbanks-Morse YVA	300	257	80%	4—65	International UD14	37.5	1200	New
1—300	Buckeye Model E	250	400	90%	1—60	Buckeye Model J	50	600	95%
2—240	Fairbanks Morse YVA	200	257	85%	1—40	Buckeye Model J	30	600	95%
10—225	Buckeye Model 80	180	600	New	1—35	International UD6	18.7	1200	New
1—180	Fairbanks-Morse YVA	150	257	95%					

**Diesel**  **Motors**

POR WASHINGTON, L. I., N. Y.

**CORPORATION**

TEL: POR WASHINGTON 2000

As advertised in TIME and NEWSWEEK

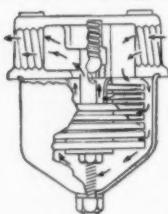
## New filter cleans all the oil all the time

ARE YOU PAYING for full-flow oil filtration—and not getting it? That's what happens with conventional filters which clean only part of the oil at a time. Grit gets through, damages equipment.



AIR-MAZE ENGINEERS have the answer to this problem. It's the new Air-Maze Type "O", an entirely different oil filter which gives truly full-flow performance because it filters all of the oil all of the time!

THE TYPE "O" EMPLOYS the same Air-Maze filtering principle that protected America's finest aircraft engines in over 5 billion miles of wartime flying. And it has been thoroughly service-proven in numerous industrial lubrication, hydraulic and fuel systems.



HOW IT WORKS: The filter's unusual design incorporates many times more effective filtering area than ordinary filters, thus providing large capacity

and low pressure drop. It consists of multiple filter discs, made of extremely fine bronze screen cloth, stacked over a perforated tube. Pressures are equalized, because each disc permits filtration on both sides. Standard square screen opening is .0032". Filtration becomes finer as dirt collects.

RESULTS: When oil is filtered by Air-Maze, equipment operates better and lasts longer. There's always a plentiful supply of grit-free oil. All-metal disc assembly is easy to clean, lasts indefinitely.

HAVE YOU A FILTERING PROBLEM? If it involves oil,\* send for your free copy of the new Air-Maze bulletin on "full-flow" filters. And remember—if you build or use engines, compressors, air conditioning and ventilating equipment, or any device using air or liquids—the chances are there is an Air-Maze engineered filter to serve you better. Write Air-Maze Corporation, Cleveland 5, Ohio.



\*Note: Because most existing car and truck lubrication systems are not designed for full-flow filters, Air-Maze Type "O" are not recommended for replacement purposes.

**AIR-MAZE**  
The Filter Engineers

## Cummins Announces New Appointments



S. J. Coffey

B. A. Duling

FOUR new personnel assignments within the Distribution Division of the Cummins Engine Company, Inc., were announced recently by L. W. Beck, General Sales Manager. S. J. Coffey, former manager of Cummins Diesel Sales Corporation of Illinois, has been appointed Manager of Regions. He will work directly under the General Sales Manager in supervising the activities of the Cummins regional offices.

Byron A. Duling has been appointed Manager of Engine Distribution with headquarters at Columbus. In this capacity, he will have charge of all engine distribution to Cummins dealers and to manufacturers who use Cummins Diesels to power their equipment. Raymond Boll has been appointed Assistant Manager of the Cleveland region, with headquarters at 805 Fidelity Building, Cleveland.

## Petroleum Solvents Plant In Full Operation

PETROLEUM Solvents Corporation's new plant and laboratories, opened last year at Port Reading, N. J., are now operating on a 24-hour basis. The factory is situated at the junction of two railroads, greatly aiding shipping facilities.

More than half of the first floor is devoted to the chemical research laboratories which have the most modern equipment for making every conceivable type of chemical test and experiment. The Petroleum Solvents research staff

New Petroleum Solvents Plant



## Tachometer Adapter

FOR use with Metron hand tachometers high and low speed adapters are now available to increase or decrease the speed measuring range

of these tachometers by a factor of 10 to 1. The adapters consist of precision built gear type speed changers which slip readily over the standard tachometer head. The Type 46A adapter for very low speeds (down to 10 rpm.), gears the speed being measured up ten to one so that the user merely drops a zero from the scale reading to get the actual speed. The type

46B adapter for very high speeds (up to 10,000 rpm.) gears the speed being measured down ten to one and the user merely adds a zero to the scale reading to get actual speed. For further information write the Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.

**Order Your Copy of the 1947 DIESEL ENGINE CATALOG now. Thoroughly revised—more complete—indispensable. Convenient order coupon on Page 93 this issue. Mail it today.**

has recently developed a new product, Silo Parts Cleaner. This is now being marketed and other new products are in the process of being developed.

The manufacturing facilities are completely up to date in design and the entire plant operation is automatically controlled. A central switchboard regulates the flow of all materials into storage and from there to the mixing department and on to the packaging machines. Constant supervision of all the operations results in uniform quality and attractively packaged products.

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SEPTEMBER 1947

### New Diesel Tournapull

G. LeTOURNEAU, Inc., recently announced another model in its new line of high-speed, electric-controlled earthmoving equipment—the 35 ton-capacity Model B Tournapull.



Buda-engined Tournapull Scraper

Powered by a 225 hp. Buda Diesel engine, this machine mover is available for use with two sizes of scrapers—the new E-35 Carryall, having a 3-ton (26.1 yards, struck) capacity, or the 25-ton E-25 Carryall (16.5 yards, struck capacity). Designed for fast hauling, the unit has 4 speeds forward, 2 in reverse and travels up to 15 miles per hour.

Tournapull steering, Carryall bowl, apron and blade are all controlled by individual electric motors, replacing conventional steering principles and eliminating the need of a power control unit for scraper operations. These Tournatorque electric motors are specifically designed and built to handle heavy construction work. They are a new type AC motor with starting characteristics of DC motors.

**1947**  
ATALOG  
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### 8-Mile Railroad Pays % Dividends



This General-Electric 44-ton locomotive powered by two Caterpillar Diesels has been operated so successfully by the Alexander Railroad Company on a line of 18½ miles of track with three stations that the company has been able to pay a 3 per cent dividend. The locomotive purchased in June 1946, operates from three to five hours daily between Taylorsville and Statesville, North Carolina.



### New Recording Thermometer and Gauge Bulletin

THE Bristol Company, Waterbury, Conn., has just published a 16-page Bulletin, No. T835, on its recently announced line of Series 500 recording thermometers and gauges. The new bulletin gives detailed information in the form of descriptions and pictures of the new instruments. Complete information covering chart ranges, chart drives, thermometer bulbs, and measuring elements is also given. Write for your copy.

### Industrial Balancing Machines To Be Exhibited

FOUR different models of industrial dynamic balancing machines will be displayed in booth No. 33BB at the National Machine Tool Show in the Dodge Chicago plant Sept. 17 to 26 by the Industrial division of the Bear Manufacturing Company. The balancing of an automotive crankshaft, a fractional horsepower armature, a hammermill rotor and a combine reel will be demonstrated on the four machines. Capacities of the machines go to 2000 lbs.

You get . . . . . **MORE for your POWER DOLLAR**

**with**

**BUCKEYE**

**DIESELS**

**CYLINDER HEAD DESIGN**  
Unique Buckeye design eliminates valve cages and provides larger valve areas. Unrestricted air flow and quicker expulsion of gases increases combustion efficiency. Heads removable without disturbing exhaust or air intake manifolds.

**PISTONS**  
Nickel chromium, heat-resisting alloy iron of very fine texture and exceptional hardness. Mirror finished. Crown designed to prevent heat transfer to piston pin.

**BEARINGS**  
Reversible, shell-type, silver alloy. Manufactured by exclusive Buckeye process. With proper care will last life of engine.

**CRANKSHAFT**  
Solid forging of open hearth steel. Special chemical properties counteract fatigue and crystallization. Extra heavy construction eliminates torsional vibration and critical speeds.

**CYLINDER LINERS**  
Made of close-grained, extra hard nickel chromium alloy, mirror finished. Water-cooled over entire surface. These features more than double liner life.

**SILENT WATCHMAN**  
Cuts off fuel supply at nozzles—immediately stopping engine—if either oil or water supply drops below pressure necessary to serve engine. Exclusive Buckeye feature.

**CAMSHAFT**  
High carbon steel. Hardened valve and injection cams. Fuel injection cams adjustable by degrees.

**CONNECTING RODS**  
Drop forged from single billet of special high carbon, open hearth alloy steel. Precision balanced—rifle drilled. Buckeye method of bearing cap mounting assures positive alignment and rigidity.

**150-1440 H.P.**  
**100-1000 KW**

Every feature of Buckeye design and construction has been developed to bring the highest standards of dependability and economy to users of Diesel power.

Write today for your Buckeye catalog. Our engineering staff is always at your service. No obligation.

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LIMA . . . . . OHIO

"Be Profit-Wise and Dieselize with Buckeyes"

STATIONARY

Engine Builders Since 1908

## ENGINEERING SOCIETIES MEETINGS SCHEDULED

### A.S.M.E. 1947 Meetings

Fall Meeting	Salt Lake City	September 1-4
I.L.R.D.		
2nd National Conference	Chicago	September 8-9
Petroleum Mechanical Engineering 1947 Conference	Houston	October 6-8
Fuel and Coal Division		
10th Joint Conference	Cincinnati	October 20-22
Annual Meeting	Atlantic City	December 1-5

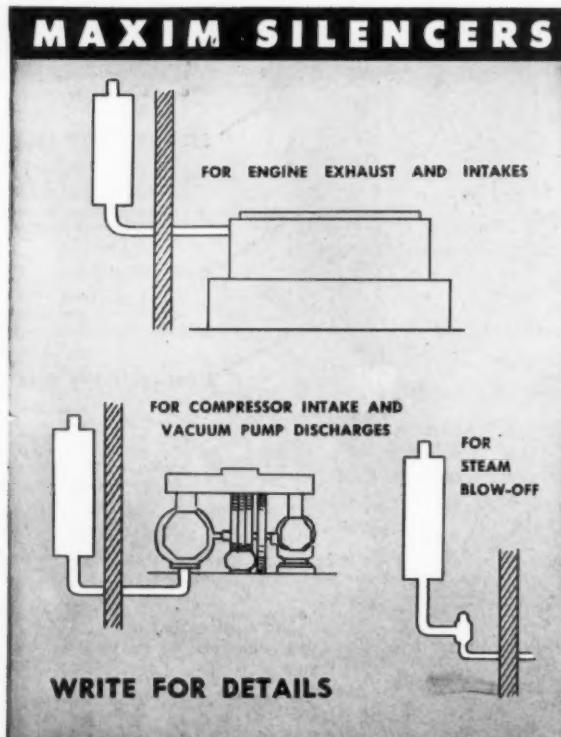
### S.A.E. National Meetings

Tractor Meeting	Milwaukee	September 17-18
Aeronautic		
Fall Meeting & Aircraft Engine Display	Los Angeles	October 2-4
Production Meeting	Cleveland	October 20-21
Fuels and Lubricants	Tulsa	November 6-7
Air Transport Engineering	Kansas City	December 1-3
Annual Meeting and Engineering Display	Detroit	January 12-16

### Diesel and Steam Plants Compared

SOME interesting statistics are listed below which offer a good comparison between steam and Diesel operated power plants. The two plants compared are the Fort Collins installation which is a high-pressure condensing steam turbine plant and the La Junta plant which is powered by Fairbanks-Morse Diesels. Both these plants are located in Colorado. The figures covering total net profit and total original investment are very pertinent as well as the fuel and lubricating oil cost items.

	Fort Collins Apr. 30, 1946	La Junta June 30, 1946
(Steam)		(Diesel)
K.W.H. Generated	11,959,148	10,344,100
K.W.H. Sold	9,459,136	8,864,090
Plant Loss	1,218,430	476,900
Line Loss	1,281,582	1,003,110
Supt., Boiler and Engine Labor	\$16,920.42	\$15,773.28
Fuel, Water & Lube	55,536.60	48,123.75
Supplies & Station Expense	4,242.18	5,722.26
Maint. of Power Plant Only	7,399.77	2,309.00
Total Production Cost	\$84,098.97	\$71,929.29
Total Production Cost Per K.W.H. Sold	.00888	.00811
Total Sale of Current Price per K.W.H. (Selling)	\$298,421.12	\$231,789.72
Total Original Investment	3.15c	2.61c
Total Net Profit	\$1,181,274.99	\$623,934.36
	\$88,888.47	\$91,393.49



**BURLINGTON INSTRUMENT COMPANY**  
1509 FOURTH STREET, BURLINGTON, IOWA

# STANDARD ENGINEERS NOTEBOOK

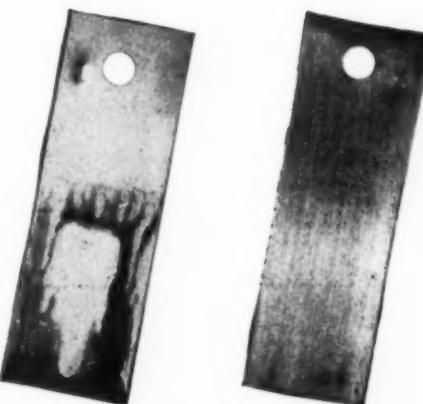
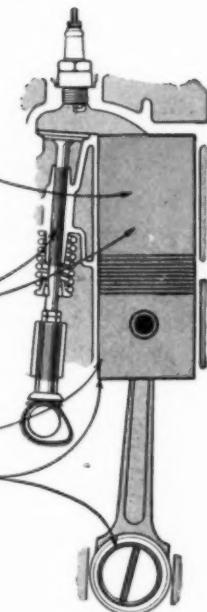


① Adhering agent in RPM Compounded Motor Oil keeps oil film on all parts after engine stops, even on cylinder walls.

② Rustproofing compounds prevent moisture that condenses on cooling parts from contacting metal.

③ No rust is formed to scrape off when engine starts, and cause excessive wear.

④ Constant lubricant film provides adequate and instant lubrication when engine starts.



This actual photograph shows how one HIGH-QUALITY MOTOR OIL "peeled" off almost all of this test strip of steel when it was placed in corrosive-moisture conditions similar to those in a cooling engine. The oil concentrated at one spot and the unprotected surface quickly rusted.

**RPM COMPOUNDED MOTOR OIL** kept this strip bright and shiny, completely sealed against rusting, when it was exposed to the same conditions. "RPM" compounds keep a constant rust-proofing lubricant film on engine parts at all times, whether they are idle or moving.

## How RPM Motor Oil Rust-Proofs As It Lubricates

Rusting, caused by corrosive moisture, is the greatest source of wear in automotive engines (85%, according to some engineers). It can be controlled by using RPM Compounded Motor Oil.

Additional compounding for "RPM," perfected by Standard of California scientists, provides a rust-proofing lubricant film on internal engine surfaces. The heaviest moisture condensation in idle or cold-running engines will not cut through it.

Other compounds in RPM Motor Oil give it adherent qualities so the film stays on parts at all times. They also loosen and remove gum and lacquer, lubricate hot spots, resist sludge formation, bearing corrosion and stop foaming.

Trademark "RPM" Reg. U. S. Pat. Off.

For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif.; The California Oil Company, 30 Rockefeller Plaza, New York 20, N. Y.; The California Company, 17th and Stout Streets, Denver 1, Colo.; Standard Oil Company of Texas, El Paso, Texas.

FOR EVERY NEED A **STANDARD OF CALIFORNIA** JOB-PROVED PRODUCT

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**Highest Quality  
Gaskets & Oil Seals**  
**by FITZGERALD**  
**Gasket Craftsmen  
for 41 Years**

Gaskets of all types and materials to give reliable service under all Diesel operating conditions.

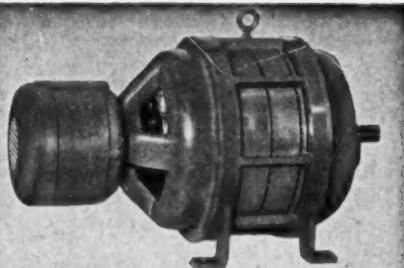
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The complete line that completely satisfies



Columbia A.C. and D.C. Generators are built to meet highest performance standards. Complete range of application, including light, power, ship auxiliaries, or custom designed units.

D.C. UNITS range from 7½ to 200 KW.  
A.C. UNITS range from 6¼ to 300 KVA.  
Speeds and other specifications to meet requirements. Write for full information.

**COLUMBIA ELECTRIC MFG. CO.**  
4519 Hamilton Ave., N.E., Cleveland 14, Ohio

**COLUMBIA  
GENERATORS**  
A.C. and D.C.

**D.E.M.A. to Present Panel at  
American Merchant Marine  
Conference**

THE Diesel Engine Manufacturers Association has been invited to present a panel at the American Merchant Marine Conference, sponsored by the Propeller Club of the United States, on October 16 at the Waldorf-Astoria Hotel in New York City.



A. P. Chalkley

Presiding at the panel will be E. J. Schwanhauser, Vice President of Worthington Pump & Machinery Corp., and President of Diesel Engine Manufacturers Association. The key speaker will be A. P. Chalkley, Editor of British Motor Ship and The Oil Engine, both of which are published in England. Mr. Chalkley, who is generally acknowledged to be the best informed authority on the shipbuilding activities of European countries, will present the facts about vessels now being constructed in Europe and the kind of power being installed in them. His address will be of special interest, as Diesel engines are now being installed in approximately 80 per cent of all large ships built abroad.

Other speakers on the panel will be Robert E. Friend, President of Nordberg Mfg. Co.; Robert P. Ramsey, Vice President of General Machinery Corp.; and J. H. G. McConechy, Chief Engineer, Sun Shipbuilding & Dry Dock Co.

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**RELIANCE  
quality  
TACHOMETERS**

Reliance Tachometers are the standard wherever accurate, dependable measurement of engine speed is desired.

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Satisfaction **VALVE SEATS**  
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Made of Synthetics or Rubber.  
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Can Furnish Rings made to AN Airforce Specifications

We Mold and Fabricate all Mechanical and Industrial Rubber Goods from Rubber or Synthetics

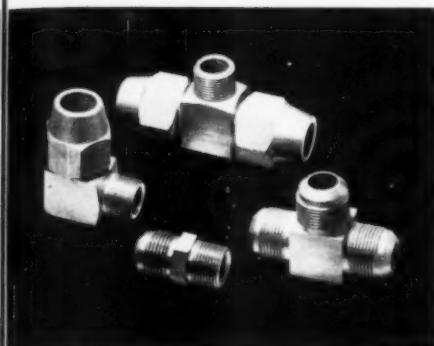
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**GOSHEN RUBBER &  
MFG. CO.**

1947 S. 9th Street, Goshen, Ind.

**Crafts Resigns as Pickering President**

DUE to ill health, I. M. Crafts has resigned as President of Pickering Governor Company with which he was associated for a period of over 27 years. S. M. Whitby, Treasurer, is now in charge as General Manager of the company which was established in 1862 and whose governors are well known throughout the Diesel industry. Charles B. Taylor continues in the capacity of chief engineer.

**Heavy Duty Tube Fittings**

New type, heavy duty, Flodar fittings.

A NEW line of commercial tube fittings, designed for heavy duty service has recently been announced by the Flodar Corporation. It is said that these new type fittings are 21 per cent heavier and stronger than fittings of similar size and are suitable for heavy duty or high pressure applications. They are made of steel and finished in cadmium plate. These fittings are manufactured in sizes from  $\frac{1}{4}$  in. to  $1\frac{1}{2}$  in. and are available in straight-union-elbow-side tee-tube tee and cross, both male and female. For further information write the Flodar Corporation, 331 Frankfort Ave., Cleveland, Ohio.

**Socony-Vacuum Names Keyser Manager of Lubricating Oil Department**

PAUL V. KEYSER has been named manager of the lubricating oil department, Socony-Vacuum Oil Company, Inc., it was announced recently. He succeeds H. S. Merriman, who becomes a member of the national accounts department.

Mr. Keyser is at present director of the company's Research and Development Laboratories, Paulsboro, N. J. He will be succeeded by Thomas P. Simpson, who is now assistant director of the Research and Development Laboratories.

**Select from most complete line of air compressors 1 TO 80 C.F.M.**

The answer to an efficient and economical air supply lies largely in getting the *correct* size and type compressor for the job. Your problem is simplified when you select from the Quincy line because it is the most complete line from 1 to 80 c.f.m. Each model embodies modern, improved design features — both inside and out — that assure *greater overall efficiency*. Air and water-cooled models for intermittent and continuous operation. Wide range of standard and special mountings. Quincy makes air compressors exclusively. Call in a Compressor Specialist from Quincy.

**Quincy**  
COMPRESSORS

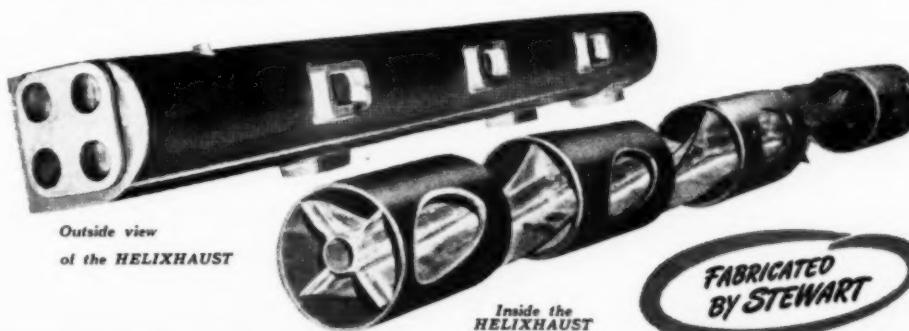
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# THE... HELIXHAUST

## WATER-COOLED MANIFOLD

The HELIXHAUST reduces temperature of exhaust gasses—makes engine room more livable. It increases permissible supercharged rating of Diesel engines. It's simple, yet highly efficient, neater and more attractive when mounted on the engine. *It modernizes 4-cycle Diesels by turbo-charging.* Write for literature containing complete specifications on the HELIXHAUST and details on Intake Manifolds, Water Inlet Headers and Water Discharge Pipes. Stewart engineers will be glad to talk over with you further the advantages of the HELIXHAUST Water-Cooled Manifold.



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## WITTE SIMPLICITY CUTS YOUR DIESEL POWER COSTS

Accelerated combustion means top power delivery per fuel gal.

Swift power-producing expansion of gases is stepped up by the performance-proved design of the WITTE pre-combustion chamber. Full Diesels, WITTE Diesel Engines and WITTE Dielectric Plants are built around this vital design principle.



There's a Compact WITTE Diesel Unit Ideal for YOU

Whether you use your WITTE as a main or auxiliary power source, you know you can count upon its trouble-free performance. Write for descriptive literature. EST. 1870



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DIVISION OF  
BELL SUPPLY COMPANY

UNITED STATES STEEL  
CORPORATION SUBSIDIARY

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KANSAS CITY MO. U.S.A.

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ONE INSTRUMENT

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1000-4000 RPM  
3000-12,000 RPM

CATLG. NO. 346

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400-1600 RPM  
1200-4800 RPM  
4000-16,000 RPM  
12,000-48,000 RPM

FOR DETAILS WRITE FOR BULLETIN NO. 750.

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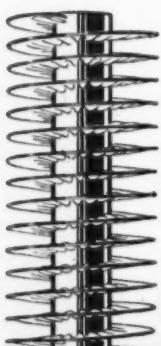
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FIN-TYPE COILS  
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Fast, Efficient  
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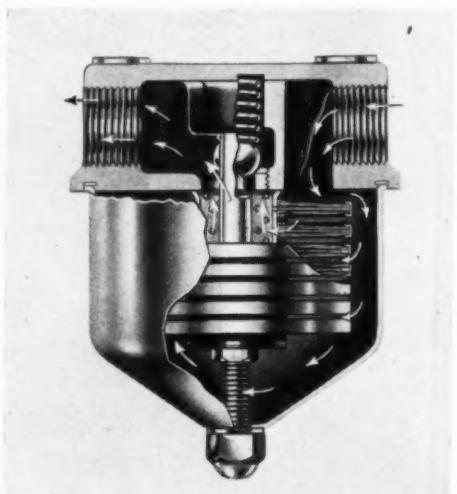
AEROFIN  
CORPORATION

S. Geddes St., Syracuse 4, N.Y.



## New Oil Filter Announced

A NEW type oil filter for full-flow filtration of lube, fuel and hydraulic oils has been announced by Air-Maze Corporation. This is an all metal, cleanable, permanent filter offered in a range of capacities from 1.7 gpm. to 45 gpm. The filter, which is notably compact, features unusually low pressure drop resulting from its exclusive design.



Cutaway view of Type "O" filter. Arrows show path of oil.

Filtering elements are individual filter discs stacked upon each other, the filtering element itself being fine wire screen cloth. A bulletin describing the Type "O" oil filter has been issued and copies may be secured by writing Air-Maze Corporation, 5200 Harvard Ave., Cleveland 5, Ohio.

## Blower Bulletin Issued By Allen Billmyre Division

AN attractive bulletin has recently been issued by the Allen Billmyre Division of the Lamson Corporation describing the blowers and exhausters manufactured by the division. The blowers range in size from the 65 cfm., 1 psi., 1 hp. model to the largest standard size model which delivers 4250 cfm. at 7 psi. Capacity tables, features of design, and general specifications are included in the bulletin which is available by writing the Lamson Corporation—Allen Billmyre Division, Syracuse 1, New York. Ask for Bulletin B-5.

## ATLANTIC Seamless Flexible Metal Hose



### Diesel Exhaust and Air Intake

Recommended for high quality and performance by engine builders, marine architects, industrial designers and engineers over the decades.

One of complete line of hoses. Send for Bulletin 1020, or Catalog.

Type shown is engine-silencer connector for Automotive and Marine Diesel Engines, Naval Vessels. Straight or bent—all sizes; suitable flanges welded on.

ATLANTIC METAL HOSE CO., Inc.  
102 W. 64th St. New York

MOTORS • GENERATORS  
TRANSFORMERS

25 cy. 60 cy. D.C.

ALL  
VOLTAGES  
1-1500 H.P.

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Forged Steel Design made to special order for all types and sizes of air and gas compressors—from 2" to 16" diameter.

Valve plates and discs of all designs in alloy steel, stainless steel, monel, brass and other metals.

Write for estimates and send samples or blueprints of your old valves.

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Don't say "Gaskets" . . . say VELLUMOID  
Vellumoid has been the standard for nearly thirty-five years because it is tougher, more compressible, easier to install. Why take chances with substitutes?

THE VELLUMOID COMPANY, Worcester, Mass.

## Diesel Generating Sets Selected To Power Plane Landing Equipment

THE discovery of a portable source of dependable, 60 cycle, 115 volt a.c. power with a stability of  $\pm 1$  volt and  $\pm \frac{1}{2}$  cycle has contributed much to current experiments in automatic plane landings.

The search for a primary source of power producing this high caliber a.c. revealed that Sheppard Diesel driven generators can be expected to deliver up to 5000 hours of steady service between major overhauls. At the end of a 2000 hour test run, the stability of the power output was greater than at the start. Previous tests, with gasoline engine driven generators, indicated that they could meet the rigid requirements for short periods of time only. After



**Sheppard Diesel generator at MacArthur field**

300 to 400 operating hours it became necessary to completely overhaul the gasoline engines to assure maintenance of power within the limiting factors. A Sheppard Diesel has been adopted and incorporated in the glide path generator now being used at MacArthur Field.

## Marine Engine Bulletin Issued by Superior Engine Division

THE Superior Engine Division of The National Supply Company recently issued a new 28-page bulletin describing all models of the company's marine Diesel engines. The new bulletin describes and illustrates how Superior marine Diesels are designed and built, both main propulsion engines and engines for auxiliary power in all types of ships. The bulletin carries 48 photographs, 8 performance charts and 5 blueprints. Horsepower ratings and specifications are given for all engines, both supercharged and non-supercharged.

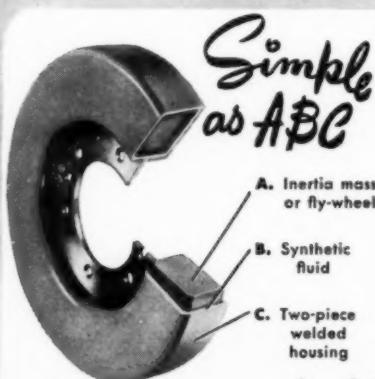
Copies of the marine Diesel bulletin, No. 4704, may be obtained by writing the General Sales Office of the Superior Engine Division, The National Supply Company, Springfield, Ohio.

## ON THE RAILS OR ON THE ROAD



## The HOUDAILLE\* Viscous Damper

### Effectively Minimizes Torsional Vibration



An exclusive development of Houde Engineering Division — patents pending.

- There are only two essential parts to the Houdaille Viscous Torsional Vibration Damper . . . the housing and inertia mass or fly-wheel. Since the housing is hermetically sealed and there are no wearing parts, there is no service, replacement or repair problem. Temperature does not materially influence the damper's efficiency because of the relatively flat viscosity curve of the fluid used.

- Houdaille Viscous Torsional Vibration Dampers are now in regular production for leading builders both of diesel engines and of automobiles. And from both, reports are the same . . . that the Houdaille Damper is completely practical and effective in reducing major and minor critical orders of vibration to a minimum. Our engineers will be glad to discuss its application to any internal combustion engine of any size.

### HOUDAILLE-HERSHEY CORPORATION

HOODE ENGINEERING DIVISION

Makers of Hydraulic Controls

BUFFALO 11, NEW YORK

\*Pronounced Hood-yee

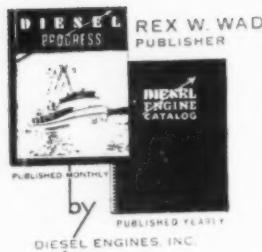
50th Anniversary

# DIESEL PROGRESS

IN INDUSTRY

IN TRANSPORTATION

ON THE SEA • IN THE AIR



THE AUTHORITATIVE MAGAZINE

of

THE DIESEL INDUSTRY

2 WEST 45th STREET • NEW YORK 19, N.Y.

TEL MURRAY HILL 2-7333

September 1947

Dear Reader:

The greatest publishing event in 50 years of Diesel engine history will take place next May with the advent of the 50th Anniversary \*Souvenir Issue of DIESEL PROGRESS. We are moving steadily to a great climax - drawing on every known source - building a huge mass of authenticated material, all to be compiled into a smooth-flowing, complete, factual and amply illustrated history of the Diesel engine and the great industry that has grown up around it.

It is a big job - too big for a few hardworking, however conscientious editors. Not to shirk our responsibility but rather to ensure the utmost in authoritative publishing for this momentous Souvenir Issue, we have appointed an Editorial Collaborating Committee comprised of men who have had long and conspicuous identity in the Diesel Industry. The proposed committee roster is given below:

John W. Anderson, Chairman

#### Historical Group

Col. Oliver Field Allen, Consulting Engineer  
Jim Barnaby, Worthington Pump & Mach'y Corp.  
C. E. Beck, Nordberg Mfg. Co.  
Geo. W. Codrington, Cleveland Diesel Div., G-M  
Hamish Ferguson, Oil Engine Consultant, London  
Edgar J. Kates, Consulting Engineer  
Carl Hanns Kurth, Fulton Iron Works Co.  
Dr. Charles E. Lucke, Columbia University  
Otto Nonnenbruch, Baldwin Locomotive Works  
Henry Schreck, American Locomotive Co.

#### Technical Group

Glenn C. Boyer, Missouri School of Mines  
and Metallurgy  
Ralph Boyer, Cooper-Bessemer Corp.  
Knut Keel, Cleveland Diesel Div., G-M  
J. H. G. McConechy, Sun Shipbuilding and  
Dry Dock Co.  
Ralph Miller, Nordberg Mfg. Co.  
R. Tom Sawyer, American Locomotive Co.  
W. W. Schettler, Fairbanks, Morse & Co.  
Dr. P. H. Schweitzer, Penna. State College

These are the men who will see to it that the \*\*May 1948 issue of DIESEL PROGRESS is fully worthy of the occasion - the 50th Anniversary of the first commercially-applied Diesel engine - an American-made engine completed in St. Louis in 1898.

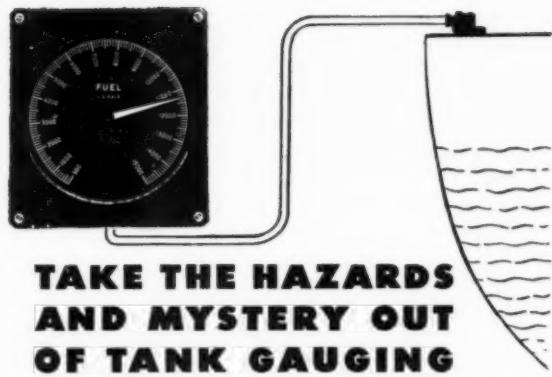
Cordially yours,

DIESEL ENGINES, INC.  
*Wilbur W. Young*

Wilbur W. Young,  
Vice President

\* Copies of this issue will sell for \$1.00 each. Orders are being booked now, daily. Order your copy (or copies) now. There will be only one printing, and press run over and above regular mailing will be determined by advance demand.

\*\* Advertisers are also ordering space now. Regular earned rates apply to this issue. Reserve your space early.



### TAKE THE HAZARDS AND MYSTERY OUT OF TANK GAUGING

Wherever fuel, water or other liquid must be measured, LIQUIDOMETER can provide a dependable gauge. These rugged, precision-built remote indicators have proven themselves by years of reliable performance in many exacting marine, railroad, aircraft and industrial applications. Remember these gauge essentials:

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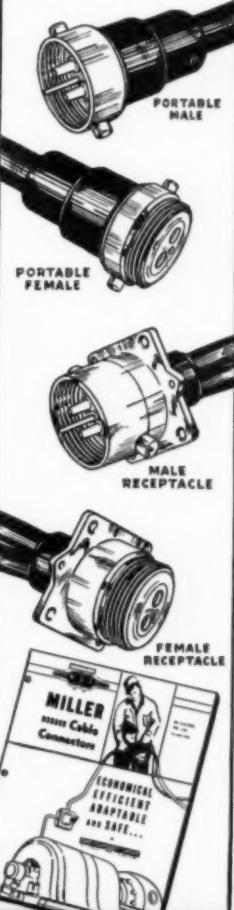
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Specified for  
**GENERAL MOTORS**

For the  
"TRAIN OF TOMORROW"



The self-contained Diesel Power Units, designed by General Motors, for Railway Passenger Cars, employ MINES Coupling Type Connectors for their power take-off requirements.

Molded of Neoprene rubber they are watertight as well as dust, oil and acid resistant. Durable manganese Bronze threaded Couplings are easily engaged or disengaged yet insure positive contact under heaviest vibrations.



We especially invite inquiries concerning connectors for Diesel engine use... regardless of their application. Send for your copy of our Bulletin No. MC-107 describing various styles and adaptations of MINES Molded Rubber Connectors.

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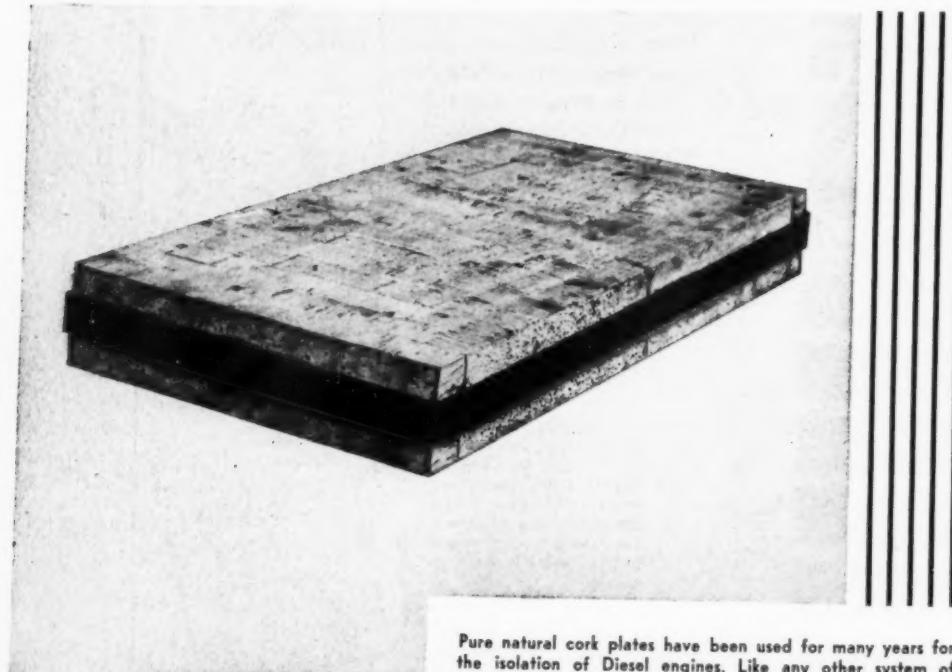
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## VIBRATION ISOLATION



**THE VIBRATION  
ELIMINATOR CO.**  
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LONG ISLAND CITY 1, NEW YORK

Pure natural cork plates have been used for many years for the isolation of Diesel engines. Like any other system of isolation they require the same accurate loading for maximum efficiency. If your engine could be suspended in mid-air there could be no transmitted vibration. The resiliency of cork is due to the fact that it is three-fourths air; in its physical behavior it follows more closely the laws of gases than the laws of solids. Cork acts like an infinite number of small balloons. Under compression it is always struggling to expand and resume its original form.

### Penn State Diesel Research and Graduate Study

OPENINGS are available for appointments of graduate assistants and research assistants in Diesel engineering at The Pennsylvania State College. Depending upon the number of vacancies in the general student body, there may also be openings for regular full-time graduate students in this field.

Graduate assistants receive stipends of \$100 per ten-month academic year, plus remission of incidental and practicum fees in their major department. Graduate assistantships require one-half-time service to the College but permit the incumbent to register in graduate courses and earn the master's degree in three semesters or in two semesters and two summers.

Research assistantships are of the same academic rank as instructorships, and are full-time positions, which permit the incumbent to carry up to six credits of graduate work per semester. The master's degree may thus be earned in five semesters, or in a shorter period if the summer is spent on research.

Thirty academic credits and the submission of a master's thesis are required for the degree of Master of Science, and an undetermined number of credits and the submission of a doctoral dissertation are required for the degree of Doctor of Philosophy. Not less than one year of full-time study is required in residence for the master's degree, and two additional years of full-time study for the doctor's degree.

The Department of Mechanical Engineering and the Engineering Experiment Station, which cooperate in instruction in Diesel engineering, are well equipped with laboratory facilities, and have experienced staffs for classroom and laboratory instruction. The College has conducted research and graduate work in Diesel engineering over a long period of years.

### New Oil Additive Announced

ANNOUNCEMENT has just been made of a new universal oil additive which improves the lubricity of all types of lubricating oils and increases their life under high temperatures and high pressures. The compound is Alox 162. It provides the necessary wetting characteristics which make it possible for the oil to completely coat the bearing surface with a closely bonded, continuous film to prevent corrosion.

In the gear lubrication field the compound reduces temperatures and answers the needs of

pressure lubri...  
the improve...  
near of bea...  
pistons. Bu...  
No. 162 is ...  
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installation e...  
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Chevrolet in...  
years was en...  
Naval person...  
plant's conven...  
was named as...  
Sales manager...  
his present p...

**The Mode...**  
By R. Tom S...  
Engineer, Di...  
motive Comp...

THIS valua...

pressure lubrication; and in the Diesel engine, the improved lubricity helps prevent undue wear of bearings and scuffing and scoring of pistons. Bulletin No. 2 fully describing Alox No. 162 is available on request. Write Alox Corporation, 3945 Buffalo Avenue, Niagara Falls, New York.

### Detroit Diesel Sets Up Great Lakes Distributorship

THE Detroit Diesel Engine Division recently announced the opening of a factory branch which has been set up to handle the retail distribution and servicing of General Motors Series 71 Marine Diesel engines in the Great Lakes area. The territory covered by the new operation will take in the entire lake coastal region with the exception of New York State, Pennsylvania, and Canada.



F. Jennings

Frank Jennings, formerly assistant to the Marine Sales manager, has been appointed branch manager and will have full sales and administrative responsibility. Mr. Jennings has a long and successful sales background which combined with his intimate knowledge of marine installation engineering well qualifies him for the assignment. He came to Detroit Diesel from Chevrolet in October 1942 and during the war years was engaged in the Service Departments Naval personnel training program. After the plant's conversion to post-war production, he was named assistant to W. C. Gould, the Marine Sales manager, and has held that post up until his present promotion.

### The Modern Gas Turbine

By R. Tom Sawyer, B. of E.E., M.E.  
Engineer, Diesel Equipment American Locomotive Company

THIS valuable book, which brings together a

tremendous wealth of useful information on the modern gas turbine and its varied uses as a supercharger and prime mover, including revised and up-to-date data on jet propulsion, is probably the most important contribution to the literature in the field in recent years.

Mr. Sawyer gives clear, thorough explanations of the fundamental principles of gas turbine operation, as well as a graphic description of inventions, and recent developments covering

industrial, marine, railroad, and aeronautical applications of gas turbines.

Every page is filled with factual, authentic data based on years of exhaustive study, research and the experience of leading engineers who have played important roles in the development of the gas turbine in America and elsewhere.

Published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y. Price \$4.00.

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Diesels like Spinning Power. It's quick, sure starting power—dependable as Diesel engines themselves. Globe-Union Spinning Power Batteries are readily available through nationwide distribution facilities. Globe-Union Batteries have Spinning Power.

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# One Magazine

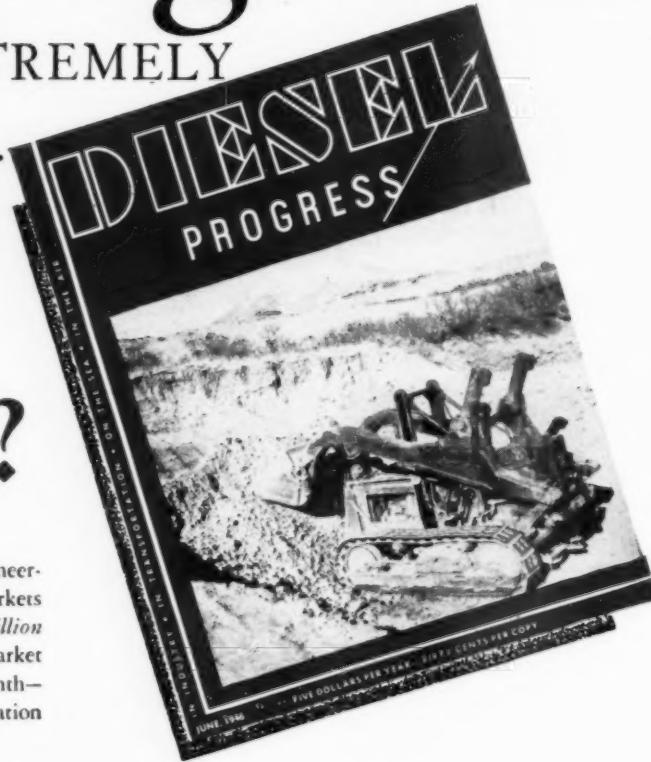
COVERS THIS EXTREMELY  
ACTIVE MARKET...

## Why buy Three?

DIESEL PROGRESS is directed to the executive, engineering, sales and purchasing personnel of the 22 major markets which combine to make their Diesel activities into a *billion dollar industry*. DIESEL PROGRESS reaches this market completely—with nearly 15,000 circulation each month—87.5% more than the circulation of any other publication which caters to it in any degree.

DIESEL PROGRESS covers engines, equipment, and accessories—their application, production and maintenance—and the new technical developments in every field of operation. Editorially it covers the Diesel field with unmatched thoroughness. During the past year more than 30 outstanding authorities, in addition to the regular staff, contributed from 1 to 19 complete articles.

DIESEL PROGRESS is the *Big Book* of the Diesel industry. It is big in format—you would call it "Life" size—with ample opportunity for large impressive illustrations, charts, diagrams. Its eye-appealing, colorful editorial section each issue



makes it highly attractive to readers—highly resultful for advertisers. For an impressive sales job, advertisers like the large 8½" x 11" standard type size pages and the larger 10½" x 13½" bleed pages.

WRITE FOR YOUR COPY OF THIS BIG BOOK. Note its advertising volume, the bigness and broad range of its editorial content. Then you'll know why one magazine—**DIESEL PROGRESS**—covers this extremely active market . . . *Why Buy Three?*

### 22 Markets that Make a Billion Dollar Industry...

- Consulting Engineers
- Naval Architects
- Utility Companies
- Government Officials
- Bus Companies
- Logging Companies

- Railroads
- Industrial Power Users
- Contractors—  
Road and General
- Municipalities
- Ship Operators

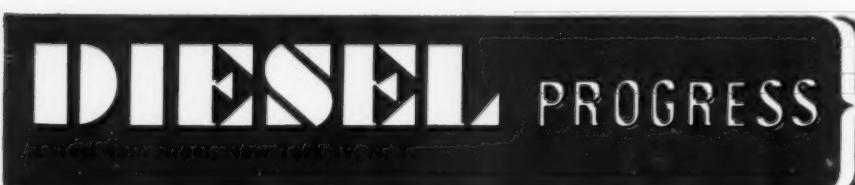
- Oil Drilling Contractors
- Air Conditioning Plants
- Engine Manufacturers
- Truck Fleet Operators
- Irrigation Projects
- Mines

- Quarries
- Shipyards
- Dairies
- Ice Plants
- Tractor Users

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# TRY UNDER ONE COVER!

## FOR DESIGN AND OPERATING ENGINEERS AND BUYERS

There is a Market Place Section—a directory of Diesel engines classified as to ratings and speeds with manufacturers' names and addresses—and a Product Directory—listing accessories, parts, materials and services—all classified as to products. The Market Place tells you at a glance where to find what you want for your engine plant.

## JUST OFF THE PRESS

### NO OTHER DIESEL BOOK LIKE IT

Over 500 Pages - Really 4 Books In One

1. The main section is devoted to descriptions, illustrations and specifications of all the Diesel engines manufactured in this country.
2. A large section carries complete illustrated descriptions of Diesel engine and plant accessories.
3. The Market Place — a classified directory of Diesel Engines and Accessories.
4. Manufacturers' Advertisements—131 pages of Catalog-type copy—informative—helpful.

## CATALOG

REVISED ANNUALLY

The most widely-used Diesel reference book published:—Because the book is revised and brought up to date minute each year, thousands of design and operating engineers, purchasing and sales executives, Diesel students buy the DIESEL ENGINE CATALOG each year and constantly refer to it throughout the year. The 1947 Edition, Volume 12, embodies sweeping changes—new models and types, revised designs—and carries the basic information published in previous editions. Whatever your interest in Diesels you will find this Edition of the DIESEL ENGINE CATALOG INDISPENSABLE.



DIESEL ENGINE CATALOG—  
Two West Forty-Fifth Street—New York 19, N. Y.

Enter my order today for a copy of the New 1947 Diesel Engine Catalog, Volume Twelve, Edited by Rex W. Wadman, for which I enclose \$10.00.

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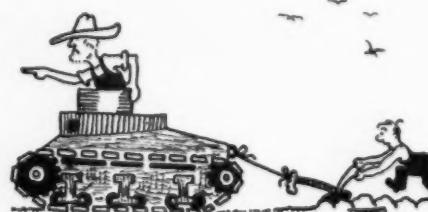
### New Buda Booklet

NEW 16 page, three color booklet—Bulletin No. 1332 which describes and illustrates four heavy-duty Diesel engines ranging in size from 180 to 300 hp. that are ideal for powering trucks, off highway and haulage equipment.

This 16 page bulletin gives construction features, details regarding combustion, installation and design as well as many illustrations of actual installations of Buda engines being used in all types and kinds of haulage equipment—issued by The Buda Company, 154th and Commercial Ave., Harvey, Illinois.

### Schoonmaker To Celebrate 50th Anniversary

A. G. SCHOONMAKER Co., Inc., of New York, will celebrate next year its Golden Anniversary of service to the power machinery field. This business was established in 1898 by the late A. G. Schoonmaker, Sr., on the eve of the development of the Diesel engine. Before the Diesel had reached its present position of importance in the power world, this company furnished all types of power machinery needed in this fast growing country of the early 1900's. Realizing the increasing value of the Diesel engine, the Schoonmaker Co. in 1921 started its rise to prominence in the Diesel power field. Starting with a few small engines, the program of expansion has been so great that today the company offers from stock a selection of Diesel engines, generators and accessory equipment. Sales for the past year approximated 130,000 hp. which included many outstanding installations in foreign countries as well as in the United States. Frequently this work requires remanufacturing of the engines and for this purpose the company operates home shops in Jersey City, N. J.; and field operations with complete shop facilities at Baltimore, Md.; Los Angeles, Calif.; and New Orleans, La. The engineering department coordinates the various manufacturing and installation operations to provide all power users with complete Diesel generating plants which carry "full coverage" written guarantees. Recent installations include Sturgis, Mich.; Orillia, Ontario, Canada; Plattsburgh, N. Y.; Idaho Falls, Idaho; Cheboygan, Mich.; Medillen, Colorado; Tocopilla, Chile; Tucuman, Argentina.



Send for new  
bulletin 7P9



114 Liberty St., N. Y.

**FOR SALE**

One 80 HP, twin cylinder Diesel engine made by Fairbanks, Morse & Co. Includes air tanks and water pump. Excellent condition.

### FITZPATRICK LUMBER CO.

900 South Ninth Street  
Springfield, Illinois

### De La Vergne Diesel Driven Ammonia Compressor

Engine:—5 cylinder, 400 HP, 15" bore, 18" stroke solid injection, 300 RPM.

Compressor:—(DMC Unit) 3 cylinders, capacity 7 ton each, 11½" bore x 18" stroke single acting.

This engine is constructed so it can easily be connected to an 8-cylinder engine and has an extension shaft for an auxiliary flat or V belt drive.

Chr. Heurich Brewing Co.  
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**West Coast Diesel News**

By FRED M. BURT

DIESEL installation by King-Knight Company, San Francisco, for the Navy in the Federal Building will prevent any possibility of interruption of naval communications. The unit is an emergency Diesel generator set. The Sterling Viking Diesed engine, 8 in. x 9 in., 1200 rpm., 320 hp. driving a 150 kw. 120-208 G.E. generator.

FOR use in switching in their refinery at Oleum, Calif., the Union Oil Company has put into operation, a Whitcomb locomotive powered with two 275 hp. Cummins Diesel engines.

THE Lang Transportation Co., Los Angeles, has added 25 Kenworth trucks to their fleet; powered with 275 hp. Cummins Diesels; they are of special, light weight, extruded magnesium construction, with torsion bar springing.

POWERED with a 6 cyl. General Motors Diesel engine, a 50 ft. V-bottom, baby tuna clipper has just been completed by veteran San Diego market fisherman, Sam Bompensiero, and his sons, to fish for Van Camp Sea Food Co.

A NEW Lima shovel just put into use by Dragline Rentals Company of Los Angeles, is powered with a 250 hp. Cummins Diesel engine.

THE U. S. Borax Company has recently found it necessary to increase work production at their Death Valley plant and have installed a "Caterpillar" Diesel engine with an over-size generator and radiator, for operation in the extremely hot desert climate. The engine and special arrangement was sold by Shepherd Tractor & Equipment Company, Los Angeles, California.

AN addition to the growing fleet of super-size, (100-ft. long and above) purse seiners, is the *Southern Queen*, built by Tacoma Boatbuilding Co., for Capt. Joe Vilicich, San Pedro, and A. K. Anderson, Seattle; her power plant an 875 hp. Enterprise Diesel, with twin 115 hp. Buda Diesels driving 60 kw. generators for auxiliary power.

DESIGNED by Robt. W. Long and built by the Long Marine Construction Co., Seattle, the 70 ft. x 20 ft. *Reina Del Caribe*, a combination seiner and dragger of new, welded steel design, has left for the Caribbean to engage in experimental fishing; main power is a Model Cooper-Bessemer Diesel, 250 hp. direct-reversing, with a power take-off through an Airflex clutch to run the winches.

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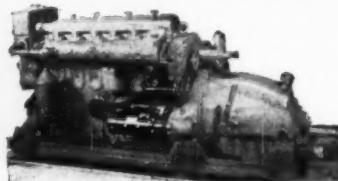
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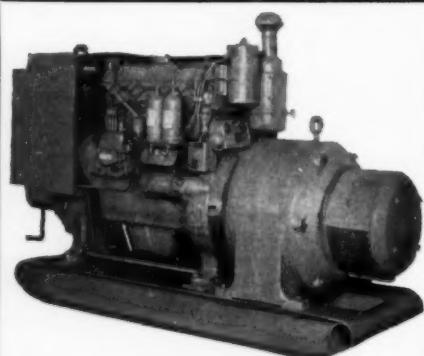
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